TECHNOLOGY DEPT.

The EDISON ELECTRIC INSTITUTE BULLETIN

March 1957

Vol. 25 No. 3.

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Published Monthly by Edison Electric Institute

25th EEI Convention Notes Chicago, Host to the Convention Electricity and Progress

Donald S. Kennedy

Service Lives, Depreciation Rates of Nuclear Power Reactors

Maurice R. Scharff

Experience and Tests with Rotor Prewarming

T. D. Reimers, R. L. Webb

Five Resuscitation Awards Presented

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

(Includes Investor-Owned Companies, Cooperatives, and Government-Owned Utilities)

December, 1955-1956

SOURCE AND DISPOSAL OF ENERGY—MONTH OF DECEMBER

	1956	1955	%
NET GENERATION* (Kwhrs in Thousands)			
By Fuel Burning Plants	42,877,821	41,470,375	+ 3.4
By Water Power Plants	9,997,502	9,344,681	+ 7.0
Total Generation	**52,875,323**	**50,815,056**	**+ 4.1**
Add—Net Imports Over International Boundaries	304,971	313,345	− 2.7
Less—Company Use	143,233	127,985	+11.9
Less—Energy used by Producer	1,194,472	1,241,853	− 3.8
Net Energy for Distribution	**51,842,589**	**49,758,563**	**+ 4.2**
Lost and Unaccounted for	5,681,093	6,104,732	− 6.9
Sales to Ultimate Customers	**46,161,496**	**43,653,831**	**+ 5.7**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of December 31st			
Residential or Domestic	45,711,460	44,408,690	+ 2.9
Rural (Distinct Rural Rates)	1,686,555	1,648,398	+ 2.3
Commercial or Industrial:			
Small Light and Power	6,124,745	6,042,309	+ 1.4
Large Light and Power	295,518	287,788	+ 2.7
Other Customers	176,615	171,416	+ 3.0
Total Ultimate Customers	**53,994,893**	**52,558,601**	**+ 2.7**
KILOWATTHOUR SALES—During Month of December (Kwhrs in Thousands)			
Residential or Domestic	12,424,456	11,495,362	+ 8.1
Rural (Distinct Rural Rates)	764,140	698,844	+ 9.3
Commercial or Industrial:			
Small Light and Power	7,428,334	6,945,282	+ 7.0
Large Light and Power	23,673,480	22,702,445	+ 4.3
Street and Highway Lighting	483,405	452,095	+ 6.9
Other Public Authorities	945,139	876,362	+ 7.8
Railways and Railroads:			
Street and Interurban Railways	213,694	243,620	−12.3
Electrified Railroads	175,061	189,877	− 7.8
Interdepartmental	53,787	49,944	+ 7.7
Total to Ultimate Customers	**46,161,496**	**43,653,831**	**+ 5.7**
Revenue from Ultimate Customers (Thousands)	**$757,026**	**$712,806**	**+6.2**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended December 31st			
Kilowatthours per Customer	2,969	2,751	+ 7.9
Average Annual Bill	$77.19	$72.63	+ 6.3
Revenue per Kilowatthour	2.60¢	2.64¢	− 1.5

* By Courtesy of the Federal Power Commission.

THE EDISON ELECTRIC INSTITUTE BULLETIN is published monthly by the Edison Electric Institute, an association of electric light and power companies in the United States and its territorial possessions. Its affiliate members consist of members of the Canadian Electrical Association.

The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

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Closing date for the BULLETIN is the tenth of the month preceding the month of issue.

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CONVENTIONS AND MEETINGS

1957

APRIL

1 EEI Industrial Power and Heating Committee, Edgewater Beach Hotel, Chicago, Ill.

1- 3 Southeastern Electric Exchange 24th Annual Conference, Boca Raton Hotel and Club, Boca Raton, Fla.

1- 4 EEI Sales Conference, Edgewater Beach Hotel, Chicago, Ill.

3- 4 17th Annual Young Men's Utility Conference, Terre Haute House, Terre Haute, Ind.

3- 5 Missouri Valley Electric Association Engineering Conference, Hotel President and Municipal Auditorium, Kansas City, Mo.

8 EEI Accounting Division Advisory and Executive Committees Nominating Committee, Madison Suite, Sheraton-Park Hotel, Washington, D. C.

8-10 EEI-AGA 1957 National Accounting Conference of Electric & Gas Utility Accountants, Sheraton Park and Shoreham Hotels, Washington, D. C.

8-11 EEI Transportation Committee, Texas State Hotel, Houston, Texas

15-17 AIEE Great Lakes Dist. Meeting, Hotel Fort Des Moines, Des Moines, Iowa

18-19 EEI Industrial Relations Committee jointly with Personnel Sections of Indiana Electric Association and Ohio Electric Utility Institute, and Personnel Practices Committee of Pennsylvania Electric Association, Netherland Plaza Hotel, Cincinnati, Ohio

21-23 Rocky Mountain Electrical League Annual Spring Conference, Shirley Savoy Hotel, Denver, Colo.

24-25 Pacific Coast Electrical Association Administrative Services Section, Hotel La Playa, Carmel, Calif.

24-26 EEI Meter & Service Committee, Soreno Hotel, St. Petersburg, Fla.

24-26 Northwest Electric Light & Power Association Engineering & Operation Section, Sun Valley, Idaho.

28 EEI Purchasing and Store Executive Committee, Penn Sheraton Hotel, Pittsburgh, Pa.

29-30 EEI Insurance Committee, Williamsburg Inn, Williamsburg, Va.

29-May 1 EEI Purchasing and Stores Committee 10th Annual Meeting, Penn Sheraton Hotel, Pittsburgh, Pa.

29-May 1 EEI Accident Prevention Committee, Algiers Hotel, Miami Beach, Fla.

MAY

2- 3 EEI Transmission and Distribution Committee, Muehlebach Hotel, Kansas City, Mo.

5- 9 American Ceramic Society Annual Meeting, Statler Hilton Hotel, Dallas, Tex.

6- 7 PEA Communications Committee, Hotel St. Francis, Canton, Ohio

6- 8 EEI Prime Movers Committee, Tides Hotel, St. Petersburg, Fla.

6- 8 Northwest Electric Light & Power Association Business Development Conference, Vancouver Hotel, Vancouver, B. C.

1957

8 ECAP Copy Group, Hotel Statler, Cleveland, Ohio

9-10 PEA Electrical Equipment Committee, Spring Meeting, Hotel Roosevelt, Pittsburgh, Pa.

13 EEI-AGA Accounting Division Time and Place Committee, AGA Headquarters, New York, N. Y.

14 EEI-AGA Accounting Division Orientation Meeting, EEI Headquarters, New York, N. Y.

15-17 Pacific Coast Electrical Association Annual Convention, Fairmount Hotel, San Francisco, Calif.

16 EEI Industrial Relations Committee, Headquarters, New York City

20-21 EEI Electrical System and Equipment Committee, Statler Hotel, Buffalo, N. Y.

JUNE

3- 5 EEI Annual Convention, Chicago, Ill.

14 Public Utilities Association of the Virginias Accident Prevention Conference, Daniel Boone Hotel, Charleston, W. Va.

17-21 American Society for Engineering Education Annual Meeting, Cornell, Ithaca, N. Y.

19-21 CEA Annual Convention, Murray Bay, Quebec

23-25 Wisconsin Utilities Association Annual Convention. Accounting Section, King's Gateway Hotel, Land o' Lakes, Wisc.

23-26 Michigan Electric Association, Grand Hotel, Mackinac Island, Mich.

SEPTEMBER

9-13 Illuminating Engineering Society National Technical Conference, Biltmore Hotel, Atlanta, Ga.

19-20 EEI-AGA Organization Meeting, Leamington Hotel, Minneapolis, Minn.

20-21 39th Annual Meeting, Public Utilities Association of the Virginias, Green-Brier Hotel, White Sulphur Springs, W. Va.

23-25 EEI Industrial Relations 10th Round Table Conference, Drake Hotel, Chicago, Ill.

24-26 EEI Meter & Service Committee, Hotel Nicolett, Minneapolis, Minn.

25-27 PIP 1957 Workshop Conference, Whittier Hotel, Detroit, Mich.

30-Oct. 1 EEI Electrical Systems and Equipment Committee, Cosmopolitan Hotel, Denver, Colo.

OCTOBER

2- 4 Indiana Electric Association, French Lick-Sheraton Hotel, French Lick, Ind.

17-18 EEI Transmission and Distribution Committee, Statler Hotel, Boston, Mass.

23-24 EEI-AGA Accounting Division Taxation Accounting Committee, Williamsburg, Va.

28-31 NARUC Annual Convention, Peabody Hotel, Memphis, Tenn.

NOVEMBER

7- 8 Pacific Coast Electrical Association Hawaiian Conference, Reef Hotel, Honolulu, Hawaii

Notes on 25th Annual EEI Convention in Chicago, June 3-5

THE program and general arrangements for the Annual Convention of the Edison Electric Institute, to be held in Chicago, June 3-5, are rapidly nearing completion. With "The American Way to a Powerful Future" as its keynote and theme, the Convention will also mark the 25th Anniversary year of the Institute, which fittingly held its first convention in Chicago in June 1933.

The importance of the program and the central location of the convention city are expected to be major factors in attracting one of the largest attendances of the industry's leaders in EEI Convention history. Convention headquarters will be the Palmer House which was also the scene of the first convention.

A special program also will be given at Civic Opera House for delegates and guests as well as a luncheon and other activities at the Edgewater Beach Hotel for the ladies attending th convention.

J. E. Corette, President of The Montana Power Co., is Chairman of the Convention Program Committee.

J. E. CORETTE
Chairman, Convention Program Committee

Other members of the Committee are: A. M. Beebee, Chairman of the Board and chief executive officer, Rochester Gas and Electric Corp.; J. W. Evers, President, Commonwealth Edison Co.; C. E. Kohlhepp, President, Jersey Central Power & Light Co., and W. A. Parish, President, Houston Lighting & Power Co.

Mr. Corette's Committee has prepared a program which will cover a diversity of subjects of immediate interest and value to the industry. These will include atomic energy, the industry's accomplishments, its future leaders and potentialities, financing of its construction program, safety, states rights and free enterprise, and regulation. Several of the addresses will be devoted to public relations and public information, and related subjects.

The fifteen outstanding speakers who will address the general sessions of the Convention are preponderantly from fields other than the electric industry and will bring fresh points of view, experience and specialized information which should be of great value to convention delegates.

The five general sessions will be held in the Grand Ballroom of the

W. A. PARISH

J. W. EVERS

A. M. BEEBEE

C. E. KOHLHEPP

Members of the Convention Program Committee

Palmer House. The first is scheduled for Monday afternoon, June 3rd. The remaining four will be held in the mornings and afternoons of June 4 and 5.

Three Special Events Set

Three important social events have been scheduled during the Convention. The EEI President's Reception is the first and will be held Monday, June 3 from 5-7 p.m. in the Palmer House's Exhibition Hall.

On Tuesday, June 4, the Ladies Luncheon and program of entertainment will take place in the Polynesian Room of the Edgewater Beach Hotel. A highlight of the program will be a fashion show presented by Marshall Field Co.

The final event of the Convention, on the evening of Wednesday, June 5, will be the presentation of the Charles A. Coffin Award and a special entertainment program arranged through the courtesy of General Electric Co. The presentation and entertainment will be held at the Civic Opera House, 20 North Wacker Drive, beginning at 8:30 p.m. Details of the program which each year toplines outstanding personalities of the entertainment world will be announced at a later date.

> **Every effort has been made by the organizers of the Edison Electric Institute to build simply but at the same time to provide an adequate foundation for a structure that will meet not only the immediate needs of the industry's trade association but will provide scope for such further endeavors as from time to time may be found of advantage and profit to the member companies.—GEORGE B. CORTELYOU, *first President of the Edison Electric Institute at its first convention, Chicago, June 5, 1933.***

Registration Starts June 2

For the convenience of delegates who plan to arrive on the weekend preceding the Convention, registration will begin on Sunday, June 2, at the Palmer House. Registration facilities will be open in the foyer of the Grand Ballroom, 4th floor, from 1 to 6

(*Continued on Page* 94)

Chicago and Lake Michigan are seen here from Lake Shore Drive, one of the city's super highways with four lane traffic moving in both directions. The city has 28 miles of shoreline at its front door, unmarred by industry. This is a favorite spot for relaxation during the hotter summer months.

The imposing skyline of Chicago, host city to the 25th Annual EEI Convention, June 3-5, is shown from Lake Michigan. Huge building at extreme left is the Conrad Hilton Hotel, where many delegates will stay.

Chicago—Host to 25th EEI Convention

CHICAGO, greatest metropolis of the Middle West and fourth ranking city in the world today, will be host to the Twenty-fifth Annual EEI Convention, June 3-5. At the Palmer House—convention headquarters—member company delegates and guests will attend meetings which will have an important bearing on the entire electric industry. Many recreational and educational facilities are available to guests of this colorful city of more than three-and-a-half million people.

Situated at the foot of Lake Michigan in the heart of the rich Mississippi Valley, Chicago boasts the ideal location as it is the nation's foremost center of transportation. Twenty-two big-name railroad lines run 1700 trains in or out of the city each day at the rate of one every 48 seconds, bringing to Chicago 56,000 daily visitors. Three municipally-owned airports every year handle 475,000 airplane movements with an estimated 7,000,000 passengers. Other guests arrive by ship, by bus and by private automobile, aggregating about 12,500,000 visitors annually. The biggest railroad center in the United States, Chicago also ranks sixth among U. S. ports.

Chicago is an important cultural center. The Chicago Opera has established a world-wide reputation and presents each year singers of international importance. The Chicago Symphony Orchestra is one of the finest in the country. About half a dozen legitimate theatres operate several months of the year. The Chicago Art Institute, Michigan Blvd. at Adams St., houses America's second finest collection of art treasures and is also the home of a widely-known art school known as the Goodman Memorial Theatre and the Ryerson and Burnham art libraries.

Museum Has Coal Mine

The Museum of Science and Industry located in Jackson Park on Chicago's South Side is visited by more persons from more places than any other cultural institution in the world. Housed in the beautiful Fine Arts Building of the Columbian World's Fair of 1893, it contains acres of "live" exhibits showing the relation of science to industry, including a working coal mine.

Adler Planetarium on the lakefront at Roosevelt Blvd. was the first astronomical museum ever built in America. Shedd Aquarium in Burnham Park contains 10,000 specimens and is said to be the largest aquarium anywhere.

Chicago's public library, completed in 1897 at a cost of $2,125,000 and constructed of dark granite and limestone has rich interior decorations of varied frescoes, mosaics, ornamental bronze and iron work.

Delegates will find an individualism of its own in Chicago's architecture. The city hall and county court house is an enormous double building of a free French Renaissance style with columned facades. Among the buildings noted for their architectural boldness and beauty are the Chicago Temple, the Tribune Tower and the Wrigley Building. The Conrad Hilton Hotel where many of the delegates to the EEI Convention will be guests is the largest hotel in the world.

Chicago has contributed outstandingly to the fields of science and medicine. The city that gave mankind its first steel-girder skyscraper recently completed a spectacular mile-square medical center with scores of towering hospitals, medical schools and research laboratories.

There are also 1200 industrial research institutions within the Chicago area, as well as 200 technical

schools and fine public and private libraries like the John Crerar library, largest in the world devoted exclusively to science and technology. The Argonne National Laboratory in the western suburbs rates as one of the top centers for devising industrial utilization for the boundless possibilities of atomic energy.

In addition to its leadership in research, Chicago is also proud of its institutions of higher education. From all parts of the globe thousands of students—particularly post-graduate scholars—come to Chicago's Loyola and DePaul Universities, Illinois Institute of Technology and Northwestern in nearby Evanston. The first successful experiments in atomic reaction were achieved at the University of Chicago and the first reactor for producing electric power was a Chicago contribution.

Chicago is a city of numerous "firsts." Industrially it bows to no other city in range of products or immensity of output. More than 13,000 manufacturing plants annually pour out wares valued at $18,000,000,000 ranging from tiny delicate laboratory instruments to mammoth machines and railroad trains. Its 12,300 wholesaling and distributing firms average $17,000,000,000 in sales each year.

Could Feed U. S. Two Months

Enough meat is processed in the city every year to feed the entire United States for two months. This includes 2,265,000 cattle, 2,100,000 hogs, 575,000 sheep and 120,000 calves.

The Chicago Board of Trade, largest grain market in the world, handles $18,000,000,000 in grain contracts annually. The Chicago Mercantile Exchange has no peer with yearly futures contracts averaging $1,150,000,000 in butter, eggs, potatoes, onions and apples.

The Palmer House in downtown Chicago will be EEI Convention headquarters.

Chicago's post office income is greatest of any American city, due largely to the huge volume of business of the mail order firms—Sears, Roebuck & Co., Montgomery Ward, Spiegels and Alden's. It ranks first in steel production in the nation.

One of Chicago's chief attractions as a convention city is its geographical location. In addition to its countless facilities, including 17,000 first class hotel rooms in the downtown area, it can be reached by more persons from more sections of the country at lower cost per capita than any other community. The city's position as a convention city goes back nearly 100 years. In 1860 a man named Abraham Lincoln was nominated there at the Republican National Convention.

Chicago is the home of two major baseball clubs—the White Sox and the Cubs—and is one of the major seats of American music. Excellent swimming facilities are provided on the Lake Michigan beaches.

From 1673 Forward

The recorded history of Chicago begins in 1673 when French explorer Louis Joliet visited the area, but it had a complete rebirth after Mrs. O'Leary's legendary cow upset a lantern on Oct. 8, 1871, and started a fire that destroyed 17,000 buildings and left more than 100,000 of the city's 300,000 inhabitants homeless.

France, England and Virginia have claimed the area. Father Marquette established an Indian mission there in 1674 and in 1759 England took Chicago from France. Virginia made its claim on the area in 1778 and the following year George Rogers Clark's colonial troops drove out the British. The first permanent house — a log cabin — was built in Chicago in 1779. Illinois was admitted as one of the United States in 1818.

In 1833 the Indians, after the Black Hawk War, moved west of the Mississippi removing for all time any threat to the village by Indian attack. Only then did it begin to flourish. That same year the settlement of 550 residents was incorporated as a town and four years later with 4,000 inhabitants the town received a city charter and Chicago was on its way to becoming a great metropolis. In 1847

The Ladies' Luncheon will be held at Edgewater Beach Hotel, above, on Tuesday, June 4. An entertainment program will follow.

Museum of Science and Industry is visited by more people each year than any other cultural institution in the world.

Aerial view of downtown Chicago shows many of the city's famous skyscrapers. Michigan Ave. is shown near the right. Lake Michigan is in background, right.

a 10-mile railroad line was laid connecting Chicago and the Des Plaines River. This was the first link in a chain of railroads that eventually connected the mid-west city to the east and was the beginning of the big Northwestern Railway system.

Between 1860 and 1870 Chicago's population nearly tripled — from 109,000 to 299,000.

The great fire which caused property loss of $200,000,000 only served to inspire Chicago to unheard of heights. Aid poured in from all over the world. Soon new buildings better than the old went up and one of the first large construction projects was the Interstate Industrial Exposition Building where the Art Institute now stands.

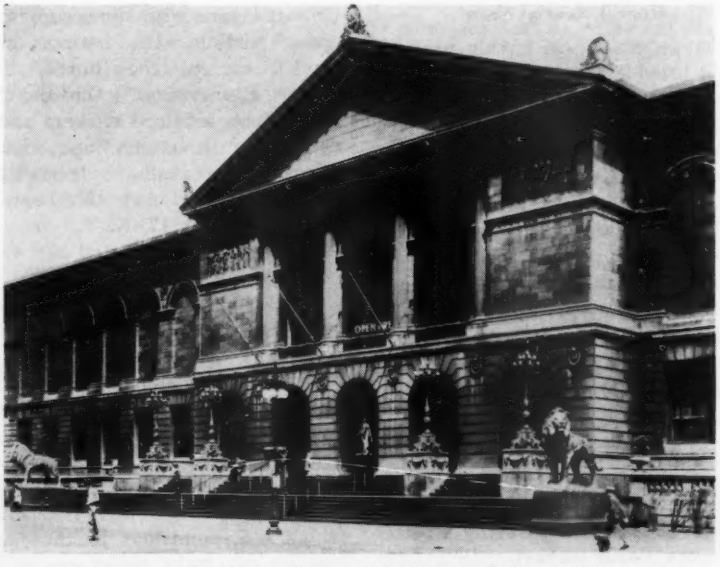
Electricity was introduced to Chicago in 1880 with a small-scale arc lighting system. The Chicago Edison Co., forerunner of Commonwealth Edison Co., host company to the Twenty-fifth Annual EEI Convention, was formed in 1887 and work started on its first central station that year. Records show that the maximum load for 1888 was not more than 300 kilowatts. The station was equipped with high-speed engines belted to Edison bipolar dynamos of the Siemens armature type, and in some cases the engines and dynamos being on the same floor. The system's peak load in 1956 was 3,734,00 kilowatts.

The Friendly City

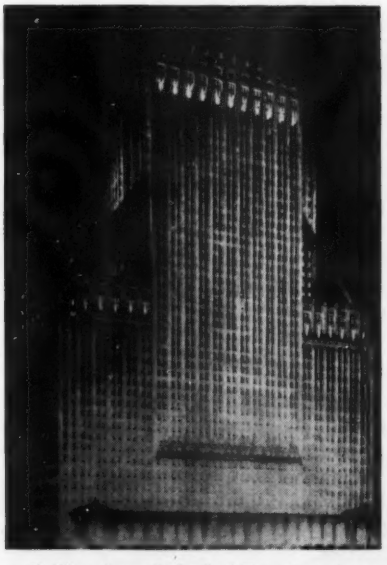
Chicago is a city of 174 beautiful parks, 220 golf courses, a botanical gardens, 12 major radio and television stations and two big zoos.

Today Chicago is a city that likes to remind you that Dwight D. Eisenhower was nominated there in 1952 by the Republican National Convention: that it is a city which will construct a new $34,000,000 Chicago Exposition and Convention Center because it entertains 1,100 meetings and trade shows each year — 33 per cent more than its nearest competitor — and that it is a city where you will find people warm, cooperative and friendly.

There is some uncertainty about the origin of the name "Chicago." Some say it means "strong" in Indian language. Others believe it is an Indian name derived from the wild onion which grew profusely in the area, while still others claim there was an Indian chief named Chikagou who lived near the lake. There are thousands, however, who agree that Chicago can mean only one thing— "hospitality."



Chicago Art Institute, above, at Michigan Blvd. and Adams St., houses the second finest collection of art treasures in America. It will welcome EEI Convention delegates.



Coffin Award and GE entertainment will be presented at Civic Opera House June 5.

'Farm Better Electrically' Program Launched by EEI

EDISON Electric Institute, with the cooperation of electric and allied industry segments selling the farm market, has launched a "Farm Better Electrically" promotional and educational program.

M. O. Whithed, Chairman of EEI's Farm Group, recently outlined the "Farm Better Electrically" proposal at a New York meeting of manufacturing representatives, rural sales personnel of electric companies, editors of farm publications and members of other interested groups. A similar meeting was held in Washington, D. C., with inter-industry and trade association personnel as well as representatives of the U. S. Department of Agriculture attending. EEI committee members also explained the program to manufacturers of farm power equipment and others in Chicago.

With unified industry backing, the program aims to electrify farms to the fullest possible extent, with a goal of 10,000 kwhr average per farm set for 1965. This is almost double the 1956 usage.

Mr. Whithed, Farm Sales Supervisor for the Atlantic City Electric Co., said the "Farm Better Electrically" program will benefit from the already established and successful "Live Better . . . Electrically" and HOUSEPOWER programs. As these programs are designed to help American families live better with increased use of electricity, so is the FBE program designed to help the farmer increase his income and living standards through increased production with the use of more electrical farming devices.

Sales Promotions Planned

Specific sales promotions to be conceived as continuing projects are planned by the group. Intensive promotions will be devoted to farm lighting, ventilation, water heating and to many other phases of farm electrification.

FBE is designed to help the farmer cut costs, solve the farm labor shortage problem, boost production, improve quality and rid materials handling of its drudgery. This added revenue for farmers gained through wider use of electrical productive and labor saving equipment is seen as a prospective booster for the entire national economy because of the correlation of the farm economy to the overall economic condition of the United States.

This symbol in red on a gold background will be available on envelope stickers, and decals to promote EEI's new program.

Huge Potential Seen

The potential which this program would provide farm equipment manufacturers equals that of the electric companies, Mr. Whithed told the New York meeting. He referred to a survey made in Kansas which indicated an immediate market for $20,000,000 worth of electrical equipment in that state alone, 25 per cent of which was for electrical farm productive equipment.

The various benefits which such a program would provide were indicated as follows by Mr. Whithed:

To the farm consumer—better products at a lower cost.

To the processor — better quality product for sale; a more uniform product at less cost, assuring a better and more stable market.

To merchants serving the farmer in rural areas — greater buying power for the farm family, giving him a better opportunity to sell his products both on the farm and in the home.

To the electrical contractor—more money for the farmer to spend contracting work and less "do-it-yourself" by farm families.

To the electrical equipment manufacturer — new potentials for new products which are unilimited in this field; a greater replacement market and better sales for existing products.

To the electric power supplier—greater loads on rural lines where capacities are now generally above the demands and in many cases it will mean a better load factor for the utility. Example: A utility with high demand on its system in the summertime should sell the farmers incubators, brooders, hot beds and poultry house and general farm lighting which could be used during the winter months when the load demand on power lines may be lower.

As the first step in launching this new program, EEI is printing stickers and decals with the "Farm Better Electrically" symbol. The circular symbol, printed in red on a gold background, shows an electric motor in the center of the circle and an end-view of a barn with silo occupying the upper portion. The bottom of the symbol carries the words "Farm Better Electrically." One-and-three-eighth-inch envelope stickers and the decals in three-inch and ten-inch sizes will be available from Edison Electric Institute at 420 Lexington Ave., New York 17, N. Y.

Booklets Explain Program

A 12-page industry booklet also is being prepared by the Institute to explain why the electric industry and its allies should support the program. In addition, a 32-page, two-color "Farm Better Electrically" consumer booklet will be made available as a handout or mail piece. This booklet will contain copy and illustrations which will point out to the farmer how he can make better use of electrically-operated farm productive equipment.

Electricity and Progress

By Donald S. Kennedy

President, Edison Electric Institute and Oklahoma Gas and Electric Co.

An Address before the American Power Conference, Chicago, March 27, 1957

FOR the past several years the individual who holds office as President of the Edison Electric Institute has had the high privilege of addressing the American Power Conference. This year the honor is mine. I assure you that I am fully appreciative of this honor and of the responsibility of representing the Institute, which is, as you all know, an association of investor-owned electric utility companies in this country.

My subject is "Electricity and Progress." Your program is full of progress and technical advances in the art of producing and distributing electricity and in my discussion I shall not attempt to compete with the engineering experts. I will give as best I can a review of the progress made and the source of strength behind that progress, all in relation to the investor-owned electric industry.

From the time of Edison's development of the first practical incandescent lamp in 1879 only 78 years have passed—less than three generations. In this time we have seen a revolution in our standard of living. Even the youngest of us here can measure in terms of his own experience the difference electricity has made in his life. In the early days, electricity was widely feared as a dangerous enemy of the public. Even as late as the early years of this century in this city of Chicago overhead trolley wires were prohibited in the Loop and electrically equipped cars were hauled behind horses in the central business district. Today, such notions seem quaint. Electricity has become an important and accepted part of our daily living.

Electric Power Cuts Drudgery

Power, now mostly electric power, has during the last century emancipated man from most of the hard drudgery of living. Consider this: In 1850, 94 per cent of all work done was done by men and animals. In 1900, this percentage had declined to 62 per cent, and as of 1950 only 6 per cent of the work was done by men and animals—94 per cent was done by machine. The latest figures show that in 1956, 98.5 per cent was done by machine. Think of how this has increased American productivity. From 1-½ man-years of human effort we are now producing 100 man-years' worth of goods. When you consider that a nation can consume only that which it produces, you can readily see how Americans today enjoy the highest standard of living of any nation on earth.

Let's measure this accomplishment in units with which we are more familiar. Fifty years ago the output of the electric industry was less than six billion kilowatthours—in 1956 it was over six hundred billion kilowatthours—a hundred-fold increase. Fifty years ago the capital of investor-owned electric utility companies was on the order of one billion dollars—today it exceeds thirty billion dollars. The rate of growth in investment now is three billion dollars per year and is expected to average over four billion a year over the next ten years.

Industry Looks Ahead

Many people fail to realize that this great development didn't just happen. The growth was made possible largely by the fact that anytime anyone has developed a new tool or built a new factory the electricity has been there to operate it. This is because the electric industry has recognized its obligation to serve the public the quantities of power demanded by it and has consistently planned for the future so as to have power available when it was wanted. Because of this planning, and because an investor-owned power company can get right down to business without getting approval from the Congress and without suffering the delays that unfortunately plague politically-managed power developments, we have been able to meet public demand for our service.

The future program of construction to meet prospective demands is vast. Last year the power companies installed 4.5 million kilowatts of power station capability. This year it is estimated that 6.7 million kilowatts will be installed and that there will be a total of 29.5 million kilowatts of station capability on order with the manufacturers by 1961. During the current year, the capital funds required not only for power station capability but also for transmission and distribution will exceed 3.8 billion dollars.

To obtain the funds for this construction the investor-owned electric utilities go to the American public, which has savings to invest. We are thankful that we have a free market at which to obtain our money requirements and that the American people served by us are, therefore, not dependent upon taxation and Government appropriation and a further increase in the federal debt for the fullfillment of their electric facility requirements.

We pay the going rate for money which we use in our business and we are not in a position to dictate what interest or return an American citizen is to get for his savings. Part of the reason that we have been able to obtain the capital with which to provide our facilities is the fact that America is a thrifty nation. The savings per capita here are the greatest in the world. The reason for this is that in America there is a strong incentive to save. This incentive is provided by the free enterprise system which gives every citizen the right to go into business for himself or to join other people in going into a mutual business, which is in effect what a person does when he buys a share of corporate stock. Not many countries in the world offer their citizens this right.

Why Standards Are High

It is this right to save and to invest the fruits of saving into an enterprise, that has enabled America to develop the machines, tools and factories which have resulted in this high standard of living that we enjoy. In some other countries, where the capi-

tal for industrial development must come from only one source—taxes—public sentiment is often against industrial development because it is going to cost the citizens money which they would rather use for something else. Thus we find for example that in England today, electric power is in short supply. The power business is being strangled by lack of capital with which to expand and meet the need for power.

In America, practically everyone saves. Every person who buys an insurance policy, participates in a union trust fund or a retirement plan, or has a bank account is a saver. Much of the money he has saved through these various means later shows up as a new tool or a part of a machine somewhere in industrial America. That tool or machine can then start to produce goods for us to enjoy. The money used by power companies to build generating plants and other facilities comes from these sources. About 60 per cent of the bonds issued by power companies are owned by insurance companies, which used the money entrusted to them by their policyholders to buy these securities.

Bonds Finance Facilities

About 50 per cent of the cost of the power company facilities comes from the sale of bonds. A bond is simply an agreement to borrow a specific sum of money which is to be returned at a later date to the saver. While the money is used, interest is paid on it. It is the safest form of security, since it is secured by a mortgage on the property.

About 15 per cent of the money is obtained through the sale of preferred stock. This stock usually pays a lower rate of return than common stock, but it is a relatively safer investment than common shares because it carries with it such advantages as a prior right to dividends or a prior claim on the assets of the company.

The remaining 35 per cent is financed by the common stockholders equity. The common stock is a pure ownership certificate, and the holders of these shares have all the benefits and assume the risks of owning the company. If the company has a loss, they are the first to suffer. If the business should fail, they would take the greatest loss. On the other hand, the advantages of this type of ownership are that if the value of the company's assets should increase, the value of the shares will also increase; if the company's earnings increase, the return to the savers will also increase.

This statement of methods of obtaining new money in our business may seem elementary to most of you and I have mentioned it here to emphasize that with regard to all the different kinds of securities which we have we must present a favorable investment for our lenders since whether or not they invest is wholly their choice. Under the free enterprise system forced investment is impossible.

Expansion Picture Bright

The industry has been successful in its operations and for this reason has enjoyed very favorable consideration from the public. Its rapid expansion has been rightly interpreted as a healthy growth carrying with it earnings which support the additional investment. The prospects for further expansion of business at rates fair to both consumer and investor seem clear as far as we can see now. The spectacular growth of the industry, with its rates for service to the public only slightly more than the lowest of historical record has been due in a large measure to the continuously expanding use of electricity and the many and continuing technical accomplishments, credit for which is due to the efforts of many who are present here. Our prospects for the future depend greatly on your continued efforts.

In our service areas and among the customer groups we serve, the people are generally satisfied with our service. Our rates and our service are supervised and regulated by the various state regulatory bodies and wholesale rates in interstate commerce by the Federal Power Commission. Under their supervision, the public is protected against possible misuse of our advantage of serving areas as a sole supplier.

Government in Business

Federal public power is essentially a minority issue—by that I mean that it is espoused by a small group—well organized, it must be admitted. This group consists of a hard core of public power protagonists who have, we are convinced, the erroneous notion that a government can operate a commercial business economically.

We have just come through a national election and some of the public power group are saying that its results vindicated the expansion of plans for public power. I do not believe this. I am no political analyst, but I have been around a few years and have talked to many people and I believe that the great majority of voters are conservative at heart and will never fall for the socialistic power programs if they become acquainted with the sad record of Government in business, and then are given a real opportunity to express their views.

Let us look at public power for a moment. Public power utilizes the same kinds of equipment and operating methods as do we. It has the same technical advantage. Now let us look at the advantages it has that we do not possess and whether they are real. First, there is the tremendous tax advantage. The federal power agencies pay either little or no taxes. The investor-owned utility industry pays taxes in the neighborhood of 24 per cent of gross earnings; or, if we relate taxes to invested capital, then our taxes represent 5½ per cent per year of plant investment. These tax payments go not only to the Federal government, which takes the largest share, but also to the state and local governments, including the public schools.

Financing Government Business

The second seeming advantage which public power has is its ability to finance itself in ways not open to free enterprise. Generally the Federal projects are financed by direct appropriations from Congress, representing taxpayers' money. Many of the Federal projects, when they do calculate an interest return on the cost, use a rate as low as 2½ per cent—a rate that does not carry a return to the Federal government equal to that paid on Governmental savings bonds and is nowhere near comparable to the return which the citizen would expect from investments made of his own free will on his own account.

Neither of these tremendous advantages enjoyed by Government power is a benefit to the economy of the nation. They are simply arbitrary subsidies which, on the face of it, permit pub-

lic power projects to charge less for their service than free enterprise, which stands on its own feet.

Here's an interesting comment in this connection. Let us assume that free enterprise is investing a million dollars in a new utility facility, on which it will pay in taxes the average for the nation of 24 per cent on annual gross revenue, or 5½ per cent per year on plant investment. This means an increase in revenue of $55,000 a year to the tax collector. If the Federal government invests the million dollars in the same facility, paying no taxes, it may make a bookkeeping entry as to cost of its investment of, let's say, 2½ per cent per year. The Federal government then, will figure on charging itself about 2½ per cent on its investment, or $25,000 per year for the use of the taxpayers' million dollars. Compare this with the $55,000 per year, which goes directly to the tax collector when the property is financed by investors.

Public Power's Tax

In order to see what the combined advantages of public power are we should note that if we take the tax requirements of the investor-owned utility at the national average of 5.5 per cent on investment capital and add to it a return of 6 per cent on investment, we obtain a requirement of taxes and return of 11.5 per cent on the investment. In the case of Government or public power, there is no tax component worth mentioning and the interest component on the use of the taxpayers' money is about 2½ per cent. This 2½ per cent represents all that the Federal government assumes for taxes and return (including of course, no Federal taxes). Thus it can be seen that an investor-owned utility lies under the burden of obtaining an annual amount equal to 9 per cent of its capital investment in excess of the charges that the Government assumes. Evaluated in terms of gross revenues at an average ratio of 4⅓ to 1, this percentage becomes approximately 39 per cent. If, therefore, an investor-owned company were able to operate without taxes and with money provided at the Government rate, it could reduce its rates 39 per cent. Conversely, a public power project, if it were required to measure up to the costs incurred by the investor-owned utility, would have costs 64 per cent higher. Obviously, the apparently rosy picture which public power presents to some people would be dissipated by such a requirement.

Preference Precludes Fair Play

This morning we listened to a fine discussion of the Preference Clause in public power legislation. I shall not labor this matter since it has been so fully discussed already. I wish to point out though that this preference is tantamount to a foreclosure of participation of the customers of an investor-owned company from receiving any part of the subsidies accorded public power because their distributing agent is prevented from buying government power on a permanent basis. The Preference Clause any way you analyze it, seems contrary to the American sense of fair play. The recipients of the preference are agencies which make no contribution to the Federal Treasury. You can rephrase the Preference Clause without distortion by stating that only those agencies which pay no Federal taxes are accorded preference in the purchase of a Government-supported product. It is as if a manufacturer were to say "We will not trade with those who support us but only with those who do not support us." Someday I hope Congress will revise this illogical clause.

In my discussion and comparison of public power with our investor-owned companies, I do not imply any criticism of the people who run America's public power bodies nor of the 20 per cent of the Americans who receive their power from such sources. As long as the law of the land provides for operation in this manner, they should not be subject to criticism for taking advantage of their privileges. I do criticize the public policy which has given rise to a certain amount of unfairness. I do not like our customers to be discriminated against as against customers served by public power. Public power customers, in all fairness, should assume the same burdens in their electric schedules as our customers assume.

Must Work Together

Regardless of differences over policy, there is an over-riding consideration which impels us all to put those differences aside and work together to keep America strong and great. There is plenty of work for all hands. We have come a long way in the past, but our future promises even greater things than our predecessors had dreamed of.

Each individual can make a substantial contribution. It is because of millions upon millions of individual contributions to our national development that we have reached the enviable position we hold today. Each of us must continue to do all he can; each must see to it that nothing he does imposes an extra burden on his brother. Each should carry his own weight and more.

Government Should Govern

This requires a national rededication to the philosophy of individual initiative and individual responsibility which has made our nation what it is today. It requires that we take every opportunity to do things for ourselves instead of asking our government to carry our load.

Our nation was born under that philosophy, the philosophy which holds that government was designed to govern—to maintain law and order and to settle disputes. We have been turning from that path, and our trend is toward a form of government under which our every problem is solved for us by the government. This is not as it was in the beginning, nor is it as it should be. Our present direction is measured by the size of the recently proposed budget, which prompted Secretary of the Treasury Humphrey to say:

"Congress enacts laws that start with the public. The public, various groups of the public—and it is getting so more and more—keep turning to the Federal Government for everything in the world to be taken care of. Whenever anybody gets into a little bit of trouble he immediately runs to Washington and asks for something to be done about it. It adds to the cost of Government and that adds to the taxes . . ."

We who live in, work with, and support this economy—and by that I mean every citizen of America—are the only ones who can redirect the course we are following. It is therefore up to us, each and every one of us, to use our American ingenuity today as we have used it in the past, to build for ourselves and for our posterity a greater America.

Average Service Lives and Annual Depreciation Rates of Nuclear Power Reactors

and Accessory Structures and Equipment

By Maurice R. Scharff

Chairman of a Subcommittee of the Depreciation Accounting Committee of the EEI-AGA on this subject

THIS paper is based upon a compilation of published data and upon inquiries by members of a Subcommittee of the EEI-AGA Depreciation Accounting Committee which has been considering its subject during the past year. Neither the author nor the Subcommittee has any illusions as to the present availability of data on these subjects based upon actual experience. Obviously, at this time, when not a single nuclear power reactor anywhere in the world has been operated through a complete service life and has been retired, the accumulation of data based upon actual experience will not begin for one, two, five, ten, twenty or more years in the future.

Many presumably well-informed students, however, have had to give consideration to the subject, and, in some cases, to make assumptions for the purpose of economic comparisons and of estimates of nuclear power costs. It is believed that it is not too early to commence the compilation of pertinent discussions and assumptions, in the belief that the accumulation and distribution of such data, and the comments and criticisms they attract, will provide a helpful background for understanding factual data as it became available later.

Three Categories

Most of the statements and discussions relating to this subject fall into one of three categories:

Statements emphasizing the difficulty or impossibility of estimating service lives and annual depreciation rates in the present state of knowledge.

Estimates of cost of nuclear power with or without statements of the total fixed charges included in such costs, leaving the related depreciation rates and service lives to the imagination of the reader.

Specific assumptions as to service lives or depreciation rates.

1. *Difficulty or Impossibility of Estimating Service Life:*

Some of the best examples of statements in this category are as follows:

Benjamin F. Feinberg, of the National Association of Railroad and Utilities Commissioners, in an address to the annual convention of that organization, on July 27, 1956, said:

> "Can we apply the straight-line method of depreciation to a reactor? Who knows what the service life of such a plant is? We must also take note of the fact that developments in reactor construction are very rapid. Dynamic American genius in the laboratory and in the engineering establishment, having developed certain types of reactors, is not resting on its oars. The engineers and physicists are constantly at work improving, changing and modifying existing reactors and studying the production of new ones. Thus, a breeder now under construction on order of a utility company, may be obsolete by the time it is scheduled to go into operation or within a few years after it is put to use."

E. W. Morehouse and Theodore Baumeister, in an article on "How Will Atomic Power Affect the Electric Power Industry?" in "Land Economics" for May, 1955, had the following to say:

> "Because of the higher investment cost of the reactor portion of an atomic power plant than the boiler section of a conventional fuel plant, the depreciation of the reactor becomes a very significant and debatable element of cost which will have to await experience to give bases for reliable estimates. We simply do not know whether the reactor will remain operable and serviceable for as long as the conventional part of the power plant, whether the core assembly portion may have to be replaced more than once in the over-all plant service life, how long a service life to assign to government-owned fuel inventory in the reactor, if necessary at all, or the extent to which obsolescence — presumably a major component of depreciation in these early stages of the new nuclear technology — will dominate service-life."

No Estimates Yet

The most frequently encountered expression of opinion, obtained from presumably qualified persons actively engaged in nuclear power activities, has emphasized that it is too early to make any estimates of service lives and annual depreciation rates.

Thus, an officer of a company participating in one nuclear power project, told one member of the Subcommittee that any assumptions as to depreciation rates now would imply a precision which was, in fact, lacking, and that the use of such data would serve no useful purpose in the present stage of development of the art. An engineer engaged in designing the plant of another project told another member of the Subcommittee that he had absolutely no idea as to the life of such a plant. And still another member of the Subcommittee, associated with another company engaged in a nuclear power project, reported that his company was of the opinion that work had not progressed far enough along this line to permit reasonable estimates.

Finally, in the course of a discussion of a paper presented by Dr. Chauncey Starr to the conference held by the Atomic Industrial Forum Inc. in Chicago in September, 1956, Dr. Starr is reported to have said, ". . . Nuclear plants should be considered

as having a lesser lifetime than conventional plants. . . . I might point out that in making the economic points that I did, I indicated that 15 per cent fixed charges are completely arbitrary. We have no real knowledge as to what a proper amortization life for a nuclear plant is."

2. *Estimates of Cost of Nuclear Power Without Specifying Service Life:*

Rear Admiral H. G. Rickover stated before the House Appropriations Committee, as quoted in the *Bulletin of the Atomic Industrial Forum* for August, 1956, as follows:

> "Recently I made a study of about 50 prospective nuclear power plants which the people claim would produce power at about 7 mills per kwh. They all come out 7 mills, no matter whether it is cooled by gas, . . . water or by liquid metal. There are only two reactors, the Shippingport reactor and the Army package power reactor, for which we are even beginning to get actual cost figures. Their power costs will be several times 7 mills."

This statement recalls Admiral Rickover's brief statement at Pittsburgh in December, 1955, that the cost of the initial production from the Shippingport pressurized water reactor would be 52 mills per kwh; and that it was hoped that developments within about ten years would make it possible to decrease this cost to about 14 mills per kwh. These estimates were stated to be based on fixed charges of 14 per cent per year, but no break-down was stated between depreciation and other fixed charges.

Other similar statements have been the statement of an engineer of the Consolidated Edison Co. before the Joint Committee of Congress in May, 1956, that the estimated cost of electric power from the Indian Point Plant would be about 9 mills per kwh, including fixed charges at 13.5 per cent; and the statement of the Commonwealth Edison Co., at the same hearing, that the cost of power from the Dresden Plant would be 7.5 mills per kwh without any statement as to fixed charges or depreciation.

W. Kenneth Davis, Director of the Reactor Development Division of the Atomic Energy Commission, stated before the Joint Committee in May, 1956, that he expected that the costs of the British Calder Hall plants, with no credit for plutonium, would be about 26 mills per kwh; that the plants expected to be built in the United States, for completion in 1960 and 1961, would show costs "generally of the order of 8 to 10 or 11 mills"; and that he would guess the power from the 11,500 electrical kilowatt reactor Westinghouse is building for Belgium, will cost "of the order of 15 to 18 mills" per kwh (Atomic Industrial Forum, June, 1956).

Cost of Nuclear Power Kwhr

Numerous other published statements regarding estimated costs of nuclear power per kilowatt hour, with or without statements of the percentages used for total fixed charges, could be cited. Many of these are in classified documents and cannot be quoted (although just why such information should still be classified is not at all clear). In the unclassified statements, however, examples of fixed charges of 13.5 to 15 per cent are common, but it would not seem worth while to compile further references to them at this time.

3. *Assumed Service Lives or Annual Depreciation Rates:*

The most official estimates of service lives and annual depreciation rates for nuclear power reactors to date are those of the Power Seminar of the Panel on the Impact of the Peaceful Uses of Atomic Energy (the McKinney Report), held Oct. 31-Nov. 1, 1955, and reported Jan. 31, 1956, on Pages 10 and 21 of Volume II of the McKinney Report. There, for the purpose of comparing the costs of electric power from nuclear reactor plants and from conventional steam plants, the Panel used a service life of 30 years and an annual depreciation rate of 3.33 per cent stating on Page 10:

> "The useful life of nuclear plants is assumed equal to conventional steam plants — 30 years to investment retirement —30 years as required capacity to supply system peak load—indefinite continued life as reserve capacity. In the author's opinions, there is no reason to expect more rapid retirement of nuclear plants than for conventional steam plants, due to obsolescence caused by rapid improvement in the economy of nuclear plants. The nature of electric utility system needs is such that additions are made to meet load growth, not to replace older, less efficient equipment. The less efficient plants simply start operating at lower lead factor, but are required for the total needs of the system. Historically, older conventional plants earn on their investment and fulfill a necessary generating function throughout their normal life. In the future, older nuclear plants will do the same."

Another study prepared by the Department of Economic and Social Affairs of the United Nations, entitled "Some Economic Implications of Nuclear Power for Under-Developed Countries," presented at the International Conference on the Peaceful Uses of Atomic Energy, at Geneva, in August, 1955, contained the following statement:

> "Depreciation constitutes the largest single cost element. The average length of life of a reactor is not at present known, and one cannot even be certain whether it will be longer or shorter than that of conventional thermal plants. One can, however, be certain that technological obsolescence of reactors — as distinct from physical depreciation — will be high in the early period since improvements must be expected to be rapid. As far as physical depreciation is concerned, most official estimates assume a life-span of 15 to 20 years, but some prospective producers of nuclear power in the United States consider 7 to 12 years a reasonable range. Hence, it would, at present, appear that depreciation and obsolescence combined would be higher in nuclear power plants than in conventional thermal plants."

At a "Symposium on the Calder Works Nuclear Power Plant," held Nov. 22 and 23, 1956, at Central Hall, Westminster, London, R. V. Moore, assistant director of the AEA's Industrial Group, submitted an estimate of cost of Calder Hall power equivalent to 12.4 mills per kwh, including fixed charges stated to be based upon an economic plant life of 20 years.

In another statement by George F. Jenkins, Manager of Chemical Processing for Union Carbide Nuclear Co., discussing reprocessing of spent nuclear fuels at the Annual Meeting of the Atomic Industrial Forum in Chicago in September, 1956, Mr. Jenkins

was quoted as saying that in the McKinney Report, depreciation is pegged at 3⅓ per cent. However, chemical plant equipment is customarily amortized at more accelerated rates than power plant equipment. The 3⅓ per cent factor is much too low for plants that are quite likely to be obsolete in a five-year period.

In the Report on "The Outlook for Nuclear Power for Japan" by Michael Safir and Sam J. Van Hyning, published by the National Planning Association in June, 1956, the authors stated: "Provision for fixed charges in an early (1965) nuclear plant probably must be set at a rate higher than that applied to a conventional plant. This is because the operating life of the reactor will probably be unknowable for some period and may be less than that of a conventional boiler. If 12 per cent is an appropriate rate for a conventional plant (6 per cent interest, 3 per cent depreciation and 3 per cent taxes and other), we would assume 15 per cent as the tentative rate for a nuclear plant."

Lecture 10 in a course on "Basic Reactor Technology," supplied to a member company by an industrial corporation with which it is cooperating in a nuclear power project, is reported by a member of the Subcommittee to read as follows: "For a conventional plant, plant life is usually taken as 33⅓ years—a depreciation rate of 3 per cent. For a nuclear plant probably a shorter life should be used—usually 10 to 20 years (5 to 10 per cent write off)."

In a discussion of the use of nuclear fuel in process and space heating, John E. Brennan, Nuclear Cost Analyst of Babcock & Wilcox Co., was reported in the "Atomic Energy Clearing House" for July 9, 1956, to have used an estimated service life for the plant of 10 years and an annual depreciation rate of 10 per cent.

One member of the Subcommittee, however, has reported an expression of opinion by nuclear engineers and consultants with whom he is associated that the life of a reactor should be approximately the same as that of the conventional generating end of an installation.

It is hoped that the presentation of this compilation of estimates and opinions may stimulate interest in the subject and that readers will submit comments and suggestions to the BULLETIN.

CORRESPONDENCE

Re the Electronic Accounting Program of Pacific Power & Light

To the Editor:

The article "Electronic Accounting Planning, Problems Discussed at EEI-AGA Seminar" on Page 27 of the January, 1957 issue of the Edison Electric Institute BULLETIN has come to my attention. On Page 28 a summary of the discussion of Pacific Power & Light Co.'s electronic program is given. In the first paragraph of this section of the article there are some misrepresentations, both as to the program Pacific Power & Light Co. followed in its computer feasibility study and my remarks at the AGA-EEI electronic conference.

In 1951 Pacific Power & Light Co. retained Stanford Research Institute (not Stanford University) to work with company personnel in preparing a feasibility study relative to the use of electronic equipment in its accounting operations. This study involved an analysis of the company's accounting requirements and a survey of available electronic equipment which would fulfill the company's accounting needs.

The study was prolonged in the early stages because medium-sized data processing computer systems were not then developed to the point where they could be adequately appraised in relation to the company's requirements. In the meantime, a list of specifications for Pacific Power & Light's accounting requirements was prepared, and when appropriate medium-sized computer systems became available, these specifications were sent to interested manufacturers through the Stanford Research Institute in the fall of 1955. As a result of the bids received from the manufacturers and a further analysis of these bids by the SRI-company team, recommendations were made to the company's management as follows:

1. The acquisition of a medium-sized computer system for accounting work was entirely justified on the basis of operating economies and improvements in information available for planning and evaluation purposes.
2. Important engineering and operating applications for the computer existed which would be of considerable value to the company.

On the basis of these recommendations and management's appraisal of the company's over-all requirements for a computer system, the Datatron was ordered in January, 1956 for delivery in April, 1957.

The implication in the BULLETIN article that there were two feasibility studies is incorrect. The study was a joint effort on the part of Stanford Research Institute and the company, and the Institute itself has been and continues to be an important factor in the company's planning for its computer installation.

Yours very truly,
DON C. FRISBEE
Assistant Treasurer
Pacific Power & Light Co.
Portland, Ore.

George E. Duerr

GEORGE E. DUERR, general sales manager for West Penn Power Co., who was active in EEI committee activities, died March 16 at his home in Dormont, Pa. He was 54.

Mr. Duerr was a past chairman of the Electric Heating Committee of Edison Electric Institute. He also had been a chairman of the Business Development section, Pennsylvania Electric Association, and chairman of the Electric Heating Committee of the Industrial Electrification Council. At the time of his death, Mr. Duerr was chairman of the Planning Committee of the latter group.

Born March 5, 1903 at New Martinsville, W. Va., Mr. Duerr in 1924 received his degree in industrial engineering from the University of Pittsburgh. He joined West Penn Power that year as a field engineer in the distribution engineering department.

He later served as a new business engineer, assistant to industrial sales manager, industrial power engineer and industrial sales manager before he was promoted to general sales manager in 1954.

Experience and Tests with Rotor Prewarming

By T. D. Reimers and R. L. Webb

Presented at the EEI Electrical System and Equipment Committee Meeting, Boston, Mass., Feb. 11

FOLLOWING the failure of the Pittsburgh Station generator rotor on the system of the Pacific Gas and Electric Co. early in 1956, the General Electric Co. advised us, as they did all operators of General Electric machines, that some form of field rotor forging prewarming should be adopted for use on all hydrogen-cooled generators of their manufacture rated 30,000 kw and larger and on all 60-cycle, air-cooled generators of 25,000-kva and larger at 3600 rpm, as well as ratings of 80,000 kva and larger at 1800 rpm. It was stated that "this will include all of the air-cooled machines having body stress conditions comparable to those existing in the hydrogen-cooled designs." The latest recommendation states that the generator rotor forging should be heated to 60° or 65°C total temperature, before the machine is brought to normal speed or to overspeed test levels.

The Westinghouse Electric Corp., while not objecting to rotor forging prewarming, has taken the stand that "it is not our requirement that either the turbine or generator rotor be prewarmed when starting from a cold condition."

Prewarming for 25 Generators

There are 25 machines on our system in the capacity range recommended for prewarming. We are attempting to do some prewarming or equivalent on both makes of generators until more data is available on this subject.

Initial Steps Taken by the Company: Representatives of the Production, Mechanical Engineering and Electrical Engineering Departments began immediate consideration of the problem of retaining heat in field rotors during short shutdown, and of prewarming field rotor forgings on startup from cold conditions. In the past no effort had been made to prevent normal cooling of generator rotors on shutting down and no special attention had been given to heating generator rotors on startup, except for a few machines where the procedure was applied for field winding preheating. In April, 1956 orders were issued to the generating stations to begin immediately to control of cooling water during operation and during shutdown to permit entering the shutdown period with as high a rotor body temperature as practical.

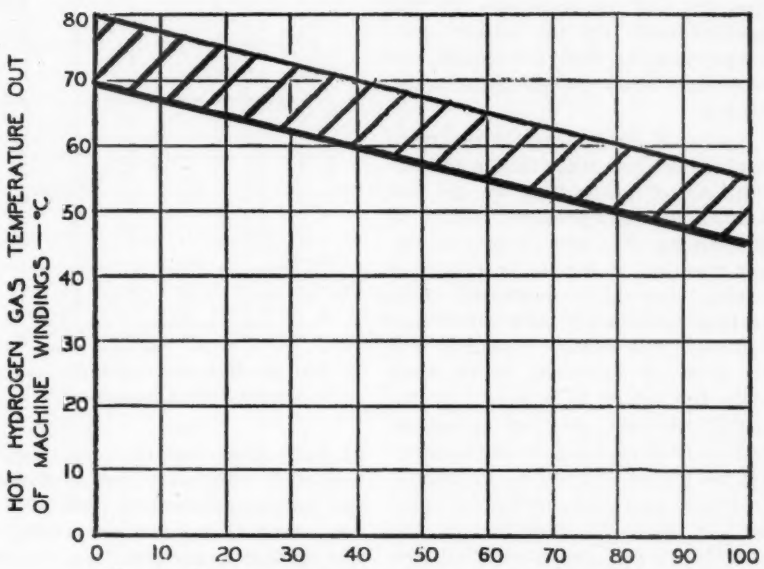


Fig. 1—Per cent of daily maximum load on generator.

The operation of the machines is based on the plotted zone of Figure No. 1. Operation in this zone permits normal temperature to be maintained in the machine windings under full-load operation and requires controlling the cooling water valves early enough in the shutdown operation to enter the shutdown period with field winding and rotor forging and stator core iron temperatures in the neigborhood of 75°C, plus or minus 5 degrees. At no point in the loading of the machine will the winding be operated at temperatures higher than the normal full-load temperatures.

For some years we have recognized that it is good operating practice to maintain constant winding temperatures at varying loads in turbine driven generators by controlling the rate of water flow in the hydrogen coolers. We also believe it is good practice to keep the hydrogen gas pressure at the top practical value for each machine since, by doing this, it is possible to keep the "constant winding temperature" at the lowest possible value under full-load conditions, thereby prolonging the life of the insulation. However, we feel we are now doing a better job of maintaining constant winding temperatures in our machines than was accomplished in the past.

Shutdown Stores Heat

Short Shutdowns: The practice of shutting down the machines in accordance with the guide of Figure No. 1 has enabled us to store sufficient heat in the machine to have starting temperatures of 60°C in the rotor body at the end of 15 to 25 hours depending on the type of machine and the care used in controlling cooling water prior to shutdown.

Figure No. 2 shows a typical cooling curve taken on a 65-mw, hydrogen-cooled generator. With an initial shutdown rotor temperature of 77°C, the rotor temperature dropped to 60°C at the end of 27 hours and to 50°C in 50 hours. Since normal temperature instrumentation does not give accurate readings with the machine on turning gear, the rotor temperatures on this test have been assumed to be the average of the stator winding temperatures. We believe that this is a reason-

ably accurate approximation of rotor body temperature within a few hours after shutdown.

It is obvious that by using this "bottling up" method on short shutdowns not exceeding a day we can apparently hold rotor temperatures close to that recommended by the manufacturer. On the longer shutdowns, such as over a weekend, we would drop below the minimum recommended.

Prolonged Shutdowns: In regard to restoration after other than a 24-hour shutdown of generators, we are not satisfied with any proposed method of prewarming. We are anxious to return machines to service as quickly as possible and have developed quick starting methods for both boilers and turbines. The boiler is usually the last piece of equipment to be made ready for return to service. In our normal turbines starting procedure the time from half to full speed usually does not exceed 30 minutes. The manufacturer's proposed method of prewarming fields by operation of the generator at half speed materially delays the synchronizing of the generator by three to five hours.

Many of our machines have shaft exciters which cannot be self excited at half speed and therefore require temporary external excitation of either the main or pilot exciter field. We do not intend to discuss prewarming by this method in any detail since papers on this subject have been presented by manufacturers. In our opinion, we think that they make this method appear too simple. We are not satisfied with the additional relay complications introduced in some units. While we do not like this method of prewarming because of the delay in restoring a unit to service, it appears to be the only presently available method after prolonged shutdowns.

Before making any expenditures for permanent facilities for half speed

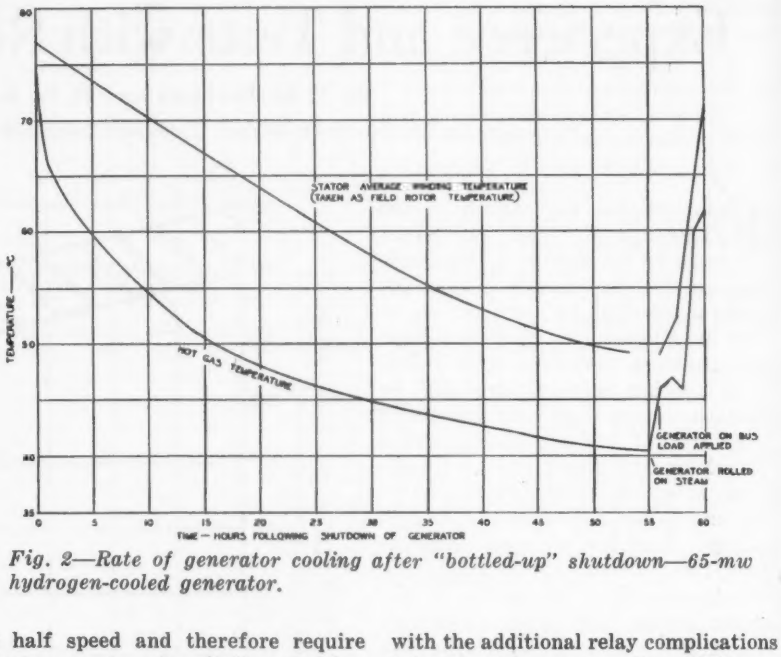

STATOR AVERAGE WINDING TEMPERATURE (TAKEN AS FIELD ROTOR TEMPERATURE)
HOT GAS TEMPERATURE
GENERATOR ON BUS LOAD APPLIED
GENERATOR ROLLED ON STEAM
TEMPERATURE — °C
TIME — HOURS FOLLOWING SHUTDOWN OF GENERATOR

Fig. 2—Rate of generator cooling after "bottled-up" shutdown—65-mw hydrogen-cooled generator.

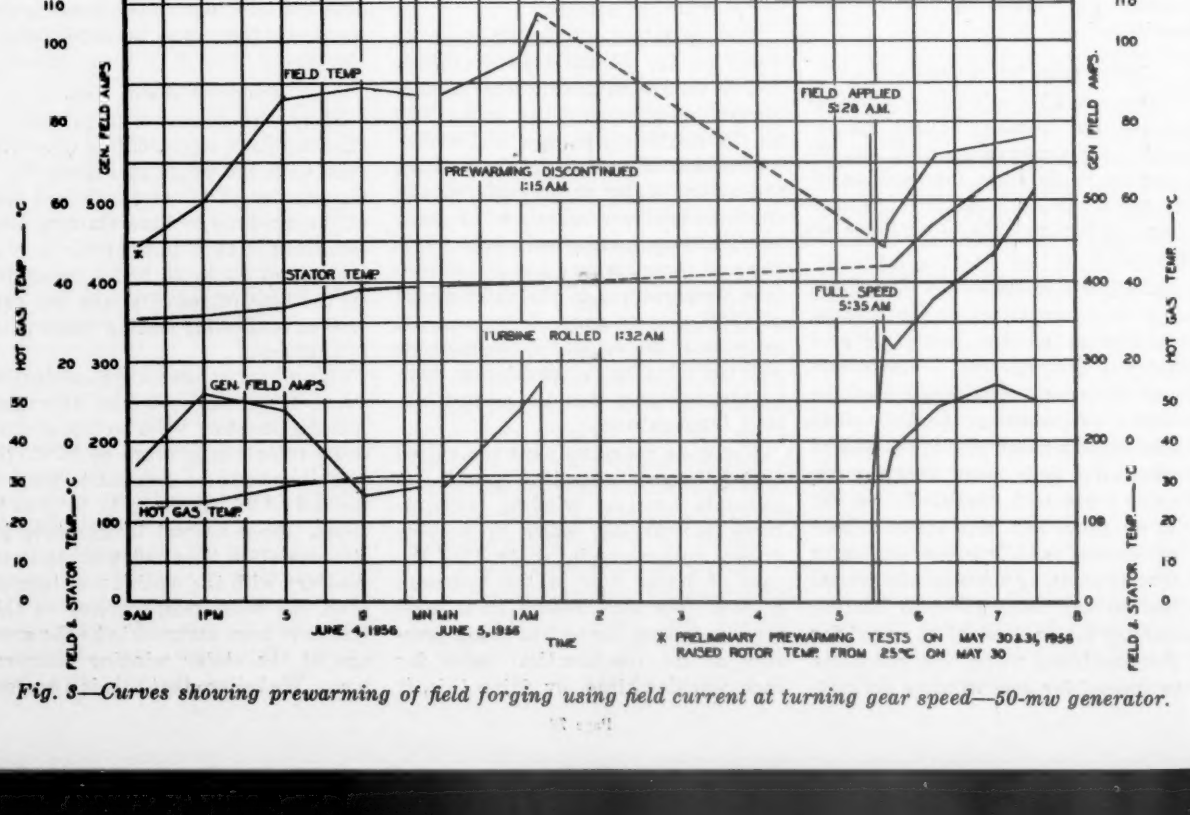

FIELD TEMP
STATOR TEMP
GEN. FIELD AMPS
HOT GAS TEMP
PREWARMING DISCONTINUED 1:15 A.M.
FIELD APPLIED 5:28 A.M.
FULL SPEED 5:35 A.M.
TURBINE ROLLED 1:32 A.M.
HOT GAS TEMP — °C
GEN. FIELD AMPS
FIELD & STATOR TEMP — °C
TIME
JUNE 4, 1956
JUNE 5, 1956
X PRELIMINARY PREWARMING TESTS ON MAY 30 & 31, 1956 RAISED ROTOR TEMP. FROM 25°C ON MAY 30

Fig. 3—Curves showing prewarming of field forging using field current at turning gear speed—50-mw generator.

prewarming, we feel that we should have two answers. One, does evidence from rotor forging tests and failure analysis, which we understand are being made, indicate that prewarming is necessary on all of the machines so far indicated? Two, if such prewarming is shown to be necessary, is there any other method which would avoid delays in generator restoration? An early progress report on the tests and analysis with suitable interpretation would be very helpful.

Several methods have been suggested to reduce starting delay. Some tests have been made to investigate these methods and others are still being studied.

Prewarming on turning gear would require a separate excitation system and does not seem economically practical for single shaft generators with direct connected exciters. Prewarming on turning gear has another disadvantage. Figure No. 3 shows a test made on a 50-mw generator which was prewarmed using a separate exciter while the machine was rolled with steam. The rotor winding was brought to a temperature of 108°C. However, as the machine was brought up in speed and as soon as the internal fans began to circulate gas the rotor winding temperature presumably dropped rapidly reaching a value of 48°C at the time field current was restored. This drop is due to the heat in the rotor forging being transferred to other parts of the machine, particularly the armature core, as the gas began to circulate. This creates a chilling condition in the outer shell of the rotor. We believe that this condition may actually be more severe for the forging than would be the case if no preheating had been used at all, since unusually high stresses may be imposed in the outer surface of the rotor forging by this rapid cooling action.

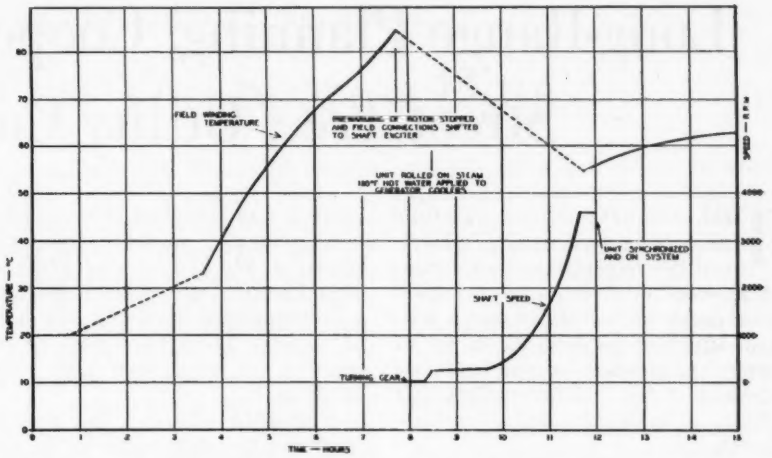

FIELD WINDING TEMPERATURE
PREWARMING OF ROTOR STOPPED AND FIELD CONNECTIONS SHIFTED TO SHAFT EXCITER
UNIT ROLLED ON STEAM 180°F HOT WATER APPLIED TO GENERATOR COOLERS
UNIT SYNCHRONIZED AND ON SYSTEM
SHAFT SPEED
TURNING GEAR
TEMPERATURE — °C
SPEED — R.P.M.
TIME — HOURS

Fig. 4—Rotor prewarming operation with field current on turning gear supplemented with hot water in 50-mw generator coolers during rolling period on steam.

Turning Gear Field Heating

Further investigation of the use of turning gear field heating will be made because we believe that on short outages it will at least extend the period that objective temperatures can be maintained in the rotor. It is also possible that the application of this method, well in advance of restoring a machine after a long outage, may give satisfactory temperatures for startup by transfer of sufficient heat to the stator to prevent sharp temperature drop in the rotor forging when it is brought to speed.

In an effort to correct the forging chilling shown in Figure No. 3, a test was made where the rotor was heated by field current while on turning gear and then when the machine was rolled on steam, 180°F water was passed through the generator cooling coils. By this means the cold stator core and winding would be heated, at least partially, by the hot water in the coolers, and thereby prevent removing so much heat from the rotor forging. Figure No. 4 shows the results of this test. This method was an improvement over warming the rotor on turning gear only, as it did result in a 30°C reduction in rotor body temperature compared to a 60° reduction on the test of Figure No. 3.

This method of combined rotor prewarming on turning gear and passing hot water through the cooling coils will be studied further. Had the initial forging temperature been taken to a higher value, the resulting rotor temperature at the time of full speed would have been higher. If this temperature value is in the more ductile range the stress change may not be so important.

In a further effort to find a way of prewarming without requiring steam to operate the generator at half speed, we are investigating the use of heaters in the form of electric units or steam coils applied directly to the casing of the generator below the turbine room floor. Sufficient heating surface will be required to permit the use of a temperature that would not damage the housing paint coating or control wiring but high enough to permit 20 to 25 kw to be absorbed by the generator housing. Since the rotor forging is protected from the heat source by the stator core and gas passages, heat soaking for a day or two will probably be required to bring the forging up to the recommended temperature. Considerable temperature gradient may develop through the machine since the heat will be distributed mainly by convection. The long soaking time will generally present no problem since the generator can usually be heated by this method before the turbine or boiler is ready. These heaters might also be used at partial capacity to reduce heat loss from a "bottled up" machine, as described earlier, for a long weekend outage. Tests have yet to be made on this method.

Motor-Driven Fan Discussed

We have also discussed with the manufacturer the possibility of introducing a small motor driven fan in the hydrogen circuit which would distribute the heat to the stator from a rotor through which current was being passed for turning gear preheating. We have not yet had an answer as to the feasibility of this method.

Overspeed Tests: We are not making overspeed tests until the unit has been operated over one peak period.

Effect of Rotor Prewarming on Stator Winding: In the last few years we have experienced severe girth-cracking and tape-separation and we

(*Continued on Page* 88)

Long-Range Planning, Cooperation Keynote Street Tree, Utility Conference

THE importance of carefully planned programs by electric utility companies and all groups interested in street tree - overhead wire problems to help reduce a hazard affecting millions of miles of power and communications lines was stressed at the 2nd Street Tree and Utility Conference in Cleveland, March 7-8.

The conference, sponsored by Edison Electric Institute, Illuminating Engineering Society and the National Shade Tree Conference, indicated that with long-range planning and cooperation of the concerned, street lights, shade trees and utility lines all can occupy the same street without interfering with each other.

In an address prepared by Harry T. Sealy, vice president of the Cleveland Electric Illuminating Co., it was explained that the majority of trouble to power lines is caused by trees. Accent was placed on cooperation and planning by everyone to enable trees and utilities to exist in harmony.

Edward H. Scanlon, CEI's consulting arborist, reviewed the company's program among cities and municipalities it serves. Since 1954 the company has made Mr. Scanlon's services available at no cost to prepare "Master Street Tree Plans" for neighboring communities to guide the planting of low-growing trees. Twenty-six such plans have been requested and 646 miles of streets already have been planned, calling for the planting of 6,600 trees.

How The Detroit Edison Co. has cooperated in planning street tree planting was described by Robert J. Kelly. In addition to distributing its booklet, "Planting for Permanent Beauty," Detroit Edison has had its "Study Tree Ordinance" adopted as a guide by 15 local governments in preparing regulations of their own. A test planting site was started by the company where species of recommended low-growing trees will be on display.

Philadelphia Electric Co. has adopted a tree program similar to that of CEI and in the eight months since it was launched 13 municipalities requested master street tree plans. J. W. Anderson of Philadelphia Electric said eight plans have been completed involving 437 miles of streets. Trees have been recommended for more than 1200 street locations.

A program of street tree pruning is offered to communities in its area by Central Hudson Gas & Electric Co. in an effort to help them get the most for their street lighting dollar. CHG&E's Taylor Barr reported that towns without mechanical equipment or unable to obtain independent tree service for pruning may have the work done by CHG&E crews when they are on the street trimming for line clearances. The community is charged on a per-hour basis.

Herbert J. Cran, arborist for Connecticut Light & Power Co., told of the accomplishments by utility companies in Connecticut. In a city-by-city report, he explained how the utility companies are working with community improvement associations, planning and zoning commissions, garden clubs, nurseries and the State Highway Department to promote a sound, functional tree planting program and to eliminate diseased, structurally weak trees.

A paper submitted by William Siden of Pacific Gas & Electric Co., pointed out the need to guide street tree planting in real estate subdivisions and unincorporated areas. PG&E launched its program in 1953 and persuaded home financing agencies to adopt its recommendations on the tree species for residential plantings. It also has an educational program for developers and is promoting model tree-control ordinances at the county level. The company suggests that new plantings be given first consideration and that the removal of old trees be saved as a long-range effort. This would tend to reduce the problem of improper selection.

S. R. Carr, past president of the National Association of Home Builders, urged that home builders be given help with tree selection. Most builders buy raw acreage and develop it. If there is any tree planting planned, the developer will do it. Mr. Carr advised that "good solid information" about tree selection and planting be brought before these men who build the greater percentage of houses in this country.

The rapid growth of tree planting programs has left the commercial nurseries comparatively unable to meet the demand for new species, warned James I. E. Ilgenfritz, past president of the American Association of Nurserymen. The demand for unheard-of tree types is creating confusion. Mr. Ilgenfritz stated that divergence of purchase specifications also is a problem. With seven to twelve years required to propagate a tree for planting, difficulties of estimating the demand this far in advance is increasing the business risk of the nurseries.

Henry T. Skinner, director of the National Arboretum, Washington, D. C., warned that it may be 10 years before supplies of new tree selections will be of significant proportions. He foresaw the possibility of supply falling behind demand for many years except for the trees already in general nursery supply.

Robert W. Wilson

ROBERT W. WILSON, manager of commercial business promotion and development for Kentucky Utilities Co., died March 10 in Lexington, Ky. He was 60.

Mr. Wilson was a member of the Wiring and Specifications Committee of Edison Electric Institute's Commercial Division. He also was a member of the Executive Committee, Kentucky Chapter, Western Section of International Association of Electrical Inspectors.

Mr. Wilson joined Kentucky Utilities in 1933. He was commercial manager since 1949. He had served as chairman of the Main Street Modernization Committee of the Kentucky Chamber of Commerce.

The Saga of Throckmorton P. Smedley—

Brother, Can You Spare a Dime?

IN the deepest days of the depression a slogan became popular among the panhandlers of the street: "Brother, can you spare a dime?" Only recently the famous slogan came to life again in Appletown, U. S. A., in connection with the saga of one, Throckmorton P. Smedley.

It all started when Mr. Smedley was riding to work on the bus one morning as had been his custom for 35 years now. It seems Throckmorton had browsed through his mail upon arriving home the preceding evening and came across his electric bill. His house at Christmas was the brightest lit house in the entire West Side of town—but momentarily that fact escaped his memory. As a result of this small lapse he received what he considered to be an outlandishly large bill for the month. And he was pouring out his wrath upon a stranger seated next to him on the bus.

"Preposterous that bill I received from the electric company. I'm on my way down there now to give them a piece of mind," he screeched in the ear of his apparently disinterested traveling companion.

"Just wait until I get ahold of those fellows down there—why the very idea."

His companion grunted quietly but did not reply. And Smedley went on raving until the bus arrived at its downtown destination where he and his companion made their separate ways.

But it was only minutes later that they met again because his silent bus partner was the man he saw behind the customer relations desk at the electric company office.

After again registering his violent complaint with the man Smedley was astonished at the action he received. The utility man suggested that in view of the special and steaming nature of Throckmorton Smedley's complaint they would set up a special meter for him. The new system had just been devised for such irrascible complainants and Smedley was to be the pilot operation.

Under the new system the utility would install a special meter in Smedley's house which required the insertion of a dime each time ten cents worth of electricity had been used. In this way Smedley would be sure of what he was paying for and could refuse to pay anytime it was his desire. Smedley was delighted with the proposed arrangement and readily agreed to the installation immediately. He then returned to his office for the remainder of the day.

Returning home that evening he began what he later told friends was the most unusual experience of his life. The electric company had already installed the dime meter and the meterman had even put in his own dime to get things going.

Being a scientific man (plus the fact that his wife and children were away on vacation) Smedley undertook to prove that it cost all outdoors for electric service. He started with the refrigerator.

Systematically he shut off everything in the house except the refrigerator and settled into a chair next to the meter with a dime in hand. About 3 a.m. the next morning he fell off the chair and woke with a start. He gave up and went to bed planning to put in the dime in the morning. But came the dawn and the refrigerator was purring along as usual. So for seven days and nights Smedley watched and waited and after the week had passed it was necessary to deposit a dime.

His first test somewhat shook Smedley's theory so naturally he undertook further experiments. This time he waited until the weekend when he knew he would not have to get up for work the next day.

Saturday at two in the afternoon he shut everything off except the television set and settled in front of it expecting to go on a trip to the meter in short order. Now at last he could prove his theory that he was really not getting much for his dime. He watched the NBA basketball

game of the week, sat through a number of shoot-em-ups, saw Jackie Gleason, Sid Caesar, and the late movie, after ten hours of continuous televiewing, his eyes bleary, he saw the set go dark. Needless to say he did not go to work on Monday—he slept all day to recover.

It was Tuesday morning when he first started to have serious doubts about his theory on the high cost of electricity. He thought about it most of the day at work and decided that it must be the high cost of lights that was the proof of his theory. That very evening he settled in his favorite chair with a book after shutting off everything except his favorite lamp with a 100-watt bulb in it. He read on into the night but fell asleep about two in the morning. When he awoke at seven the light still burned brightly. He left it burning and went to work. It was midnight the second night before it went out—30 hours of reading for a dime.

But Throckmorton P. Smedley was not an easy man to convince or discourage. In mid-week when his wife and two children returned he put them to work testing his theory.

Wearing wrinkled shirts to the office he determined that by having his wife not use the iron he saved a dime a month—but it took him 25 rumpled shirts to realize that he has just saved a dime.

He then disconnected the washing machine and had his wife do the laundry by hand. (After this experience his wife lost interest completely in the experiments.) His clothes were dingy and his wife had a backache for a month after doing 30 washes by hand—to save a dime.

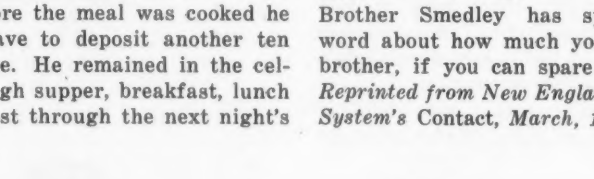
His family grew surly as they stumbled around in the dark while Throckmorton conducted further tests. He made eight cups of coffee at a time in the percolator in the kitchen. By his own calculation he had piled the room high with 240 cups of coffee before his dime in the meter ran out. Everything in the house was off for 10 days while he ran just the electric blanket to see how long that took to use up a dime. He played the radio phonograph for more than two days and nights straight before he and the phonograph collapsed with exhaustion.

The final back-to-the-wall test came with the electric range. He theorized that after all he had been testing the wrong equipment. He shut off everything and instructed his wife to cook supper in the dark. Meanwhile he went to the cellar with his dime in hand, sure this time that before the meal was cooked he would have to deposit another ten cent piece. He remained in the cellar through supper, breakfast, lunch and almost through the next night's supper before his vigilance was rewarded. That did it. The next morning—weary, exhausted and hungry, he set out for the electric company office to get his old meter back.

As he requested the restoration of the status quo he heard a customer at the next desk complaining loudly about the cost of electric service. He smiled and turned to the man complaining. All he could say with an understanding look was—"Brother can you spare a dime?"

Since that time the utility's special meter system has become known as the Brother-Can-You-Spare-A-Dime Method. There haven't been too many other applicants for it. Seems as though everytime that Throckmorton hears of a complaint he registers his stock "Brother can you, etc." and explains his experience.

Appletown isn't very large anyway and the word gets around. Throckmorton is called Brother Smedley by everyone there these days. And his original traveling companion on the bus sits all day in the electric company office behind the complaint desk with a quiet smile on his face. The Appletowners still come in to complain about one thing and another but never do they mention the cost of electricity. Brother Smedley has spread the word about how much you can get, brother, if you can spare a dime.—*Reprinted from New England Electric System's* Contact, *March, 1957.*



Frederick H. Plattner, second from right, receives the EEI Award for Resuscitation, and William Schaffer, second from left, a Medal Miniature for helping to save the life of John E. O'Banks. Ernest R. Acker, right, Central Hudson Gas & Electric Corp. president, made the presentation. George J. Ruoff, CHG&E safety director, is at left.

Five Resuscitation Awards Presented

FIVE more Awards for Resuscitation have been presented by Edison Electric Institute to electric utility company employees for their resourcefulness in applying artificial respiration to revive victims suffering from electric shock.

Since the inception of this type of recognition 24 years ago, 466 awards have been made by the Institute. The medal, symbolic of teamwork and devotion to duty, is a physical link with the historic past of the electric industry. Each medal contains copper from the original mains laid in New York City by Thomas A. Edison as part of the world's first underground system for the distribution of electric current.

A certificate signed by the EEI president and describing the resuscitation for which the award is made accompanies each medal. Medal miniatures or Certificates of Assistance are given to men who render valuable aid in resuscitations.

Reviews of cases for which Resuscitation Awards have been made since last reported in the BULLETIN in December, 1956, are presented here.

FREDERICK H. PLATTNER
Central Hudson Gas & Electric Corp.

On the morning of Oct. 16, 1956, Linemen Frederick H. Plattner and John E. O'Banks were working on a utility pole in the town of LaGrange, near Poughkeepsie when Mr. O'Banks contacted a bare tap with the inside of his left leg and allowed his head to contact an energized "open-type" cut-over which was covered by a 36" x 36" rubber blanket, but which had not been properly secured on the bottom where the exposure existed. Mr. O'Banks was rendered unconscious by 2400 volts of electricity and his breathing stopped.

The momentum carried the victim's body near Mr. Plattner who pulled the injured lineman astride his safety belt and began to administer pole-top resuscitation. Within a minute Mr. O'Banks had resumed breathing. The artificial respiration was continued while other members of the crew made arrangements for lowering the injured man. As soon as he was brought to ground, Mr. O'Banks received back-pressure, arm-lift resuscitation from William W. Schaffer, equipment operator. General shock treatment of keeping the victim in a horizontal position and massaging legs and arms toward the heart and inhalation of ammonia and maintaining body temperature was continued for 20 minutes after the accident—until the arrival of a hospital ambulance.

Ernest R. Acker, CHG&E president, presented the medal to Mr. Plattner and a Miniature Medal to Mr. Schaffer. Stories and pictures of this heroic event were published in the Kingston *Daily Freeman* and The Saugerties *Daily Post*, both New York State newspapers.

JAMES R. CLARK
Iowa Southern Utilities Co.

When a farm transformer outage was reported near Agency, Iowa, on the afternoon of Aug. 24, 1955, two journeymen linemen—C. E. Bales and James R. Clark—were dispatched to take care of the trouble.

The transformer fuse was out. Mr. Bales climbed the pole and replaced the fuse. This was a 2,400-volt, multi-ground, single-phase line. After fusing the transformer, Mr. Bales moved to the grounded side of the transformer to ask Mr. Clark to check if the customer's service had been resumed. While Mr. Clark was walking toward the house, Mr. Bales removed his rubber gloves and put on leather ones. At this moment apparently the right gaff of Mr. Bales' climber kicked out. He reached out with his right hand, grabbing the down guy which was behind him. His left arm swung around the pole and made contact with a 2400-volt jumper. Mr. Clark heard a cry and saw the other lineman hanging in his belt which was around the pole above the secondary rack.

After taking a few seconds to report

EEI Medal is presented to James R. Clark, right, for saving the life of a fellow lineman of the Iowa Southern Utilities Co. R. A. Wornstaff, left, is Iowa Southern's training and safety director, and in the center is William Cowan, manager of Cowan Construction Co., for whom Mr. Clark now works.

the accident to the line department superintendent through his truck radio, Mr. Clark put on his rubber gloves and started up the pole. The other lineman was free of the 2400-volt primary but was unconscious and was not breathing. Upon reaching Mr. Bales, Mr. Clark immediately began administering Oestereich pole top resuscitation. In two or three minutes the injured man gasped for breath and started intermittent breathing but remained unconscious. Mr. Clark continued artificial respiration until help arrived in about 20 minutes.

In the meantime the line crew, under Foreman Billy M. Amos had been called over the radio by the line department superintendent. Mr. Amos and Keith Crawford proceeded to the scene of the accident. Mr. Amos climbed the pole to assist in lowering the victim. The ambulance arrived then and oxygen was administered for about 35 minutes. He was taken to the Ottumwa hospital where he did not regain complete consciousness until 7 o'clock the following morning. Mr. Amos for his part in the resuscitation received the EEI Certificate of Assistance. A story and picture appeared in the Ottumwa newspaper.

HOMER H. RICHMOND
HARRY S. WELLS
New England Power Service Co.

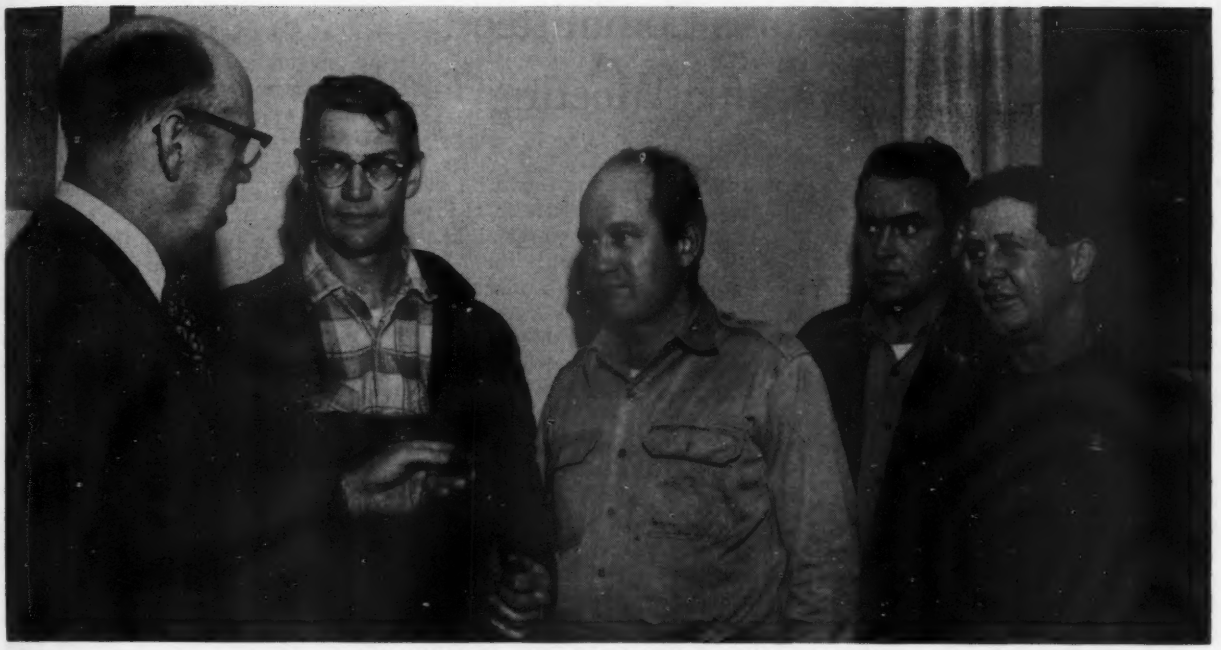
Victor J. Albec, foreman of a line crew engaged in removal of old poles on the 69-kv transmission line in Dummerston, Vt. on June 25, 1956, and Dudley A. Ferrari, laborer, who was helping him, were rendered unconscious when a ground wire they had contacted became energized.

The old poles were cut at or near the ground line and butts were pulled and a new pole set in each on the locations. Immediately before the accident, the pole had been guyed four ways with rope and rope tackle had been attached to aid in lifting the new pole. The No. 4 solid iron ground wire had been cut at ground level and at a point 43 inches above the point where the old pole was to be cut. The old pole was cut through above the ground line and the top of this pole barred over until it rested on two four-foot logs used as a mat. The top of the old pole would rest on this mat while the butt was being pulled and the new pole set.

As the top of the old pole was being barred over from the stub to this mat, Mr. Albec and Mr. Ferrari attempted to push the pole over and steady it. As this was being done the ground wire apparently became energized and the two men made contact with it.

Homer H. Richmond at the time was at the side of the right-of-way tending a guy rope. He saw Mr. Ferrari slump to the base of the pole. He pulled the injured man to a clear spot on the ground and placed him on his stomach. His face was purple and his teeth clenched tight and there was "considerable" burn about the upper part of his body. He chose the Schaeffer prone pressure method of arti-

Holding certificates awarded by EEI for helping to save the lives of two New England Power Co. men are from left: Henry Chasles (Medal Miniature); Harry S. Wells and Homer H. Richmond (Medals). They saved the lives of Victor J. Albec, second from left standing, and Dudley A. Ferrari, also standing. Seated are, from left: H. A. Suprenant, division manager; F. C. Harriman, safety director; A. S. Walker, NEPC vice president.



Chester R. Thomas, second from left, receives the EEI Medal for saving life of John Lackey, right of Thomas. A. L. Pollard, operating manager, Puget Sound Power & Light Co., presents award. C. J. McMeel and R. L. Comstock, right, were cited.

ficial respiration in order not to further injure Mr. Ferrari. This was continued for about 15 minutes before there was any sign of breathing. Mr. Ferrari gasped and breathed laboriously. His actions became violent and Henry Chasles assisted in holding down the injured man. When breathing became normal he ceased being violent. The burned areas around his head were covered with ointment.

When Mr. Albec received the shock he was thrown backwards away from the base of the pole. Harry S. Wells stretched him out on his stomach. He also used the Schaeffer method. Mr. Albec began to gasp in about 15 minutes. Mr. Chasles took over resuscitation while Mr. Wells went to the truck to radio for help.

A Medal Miniature was presented to Mr. Chasles for his part in the resuscitation.

Erwin Schiffer
Pennsylvania Power & Light Co.

On April 30, 1956, Linemen Bernard Cunningham and Erwin Schiffer were preparing to reinstall a 7200-volt OCR on a pole in Salisbury Township. Mr. Cunningham was on the pole preparing to place a set of blocks on the pole and Mr. Schiffer was on the ground unpacking the new switch. Mr. Schiffer heard a "buzz" and looking up saw the other lineman slumped backwards in his belt and slipping out of the belt. He went to Mr. Cunningham's assistance and noted no apparent life in the injured man. He began pole top resuscitation and signs of life were visible in about two minutes. Artificial respiration was continued for about five more minutes, but Mr. Schiffer was hampered in his efforts because of a mucus exuding from Mr. Cunningham's mouth, retarding his natural breathing. The lineman hailed a passing school bus driver who went for assistance. The Medal was presented to Mr. Schiffer by Charles E. Oakes, president of PP&L.

Chester R. Thomas
Puget Sound Power & Light Co.

Linemen Chester R. Thomas and John C. Lackey on Aug. 24, 1956 were transferring a primary conductor on a pole in Seattle. Mr. Lackey was standing on the end of the secondary arm with his safety belt fastened to the end of the primary arm when he accidently slipped while passing a tie to his pole partner—Mr. Thomas. He contacted an energized wire and was instantly rendered unconscious.

Seeing the flash and realizing that his partner was still on the wire, Mr. Thomas pushed him clear of the wires on the secondary line arm. He then pulled the injured lineman to him and applied pole top resuscitation. After two or three minutes Mr. Lackey began to breathe and two linemen, R. L. Comstock and C. J. McMeel who were working on the adjacent pole, went to the assistance of Mr. Thomas. They adjusted rope slings to Mr. Lackey, untangled him from the neutral conductors and assisted in lowering him to the ground and continued with resuscitation.

Mr. Lackey was treated for second and third degree burns of the thigh, left elbow and left foot.

Mr. McMeel and Mr. Comstock received Certificates of Assistance.

Life saving award is presented by Charles E. Oakes, president, Pennsylvania Power & Light Co., to Erwin Schiffer.

Purchasing and Stores Committee Schedules 10th Annual Meeting

THE Penn-Sheraton Hotel in Pittsburgh, Pa., will be the location of the tenth annual meeting of the EEI Purchasing and Stores Committee, April 29-May 1. A balanced program of purchasing and stores subjects is being arranged by the committee through various project groups.

The Executive Committee of the Purchasing and Stores Committee plans a short meeting on Sunday afternoon, April 28. Following the general pattern of previous annual meetings, official welcome to the meeting will be made on behalf of Duquesne Light Co., the host company, by Philip A. Flegler, chairman of the board and chief executive officer, at the Monday, April 29 session which starts at 9:30 a. m.

Morning and afternoon sessions are planned for both Monday and Tuesday, with group luncheons on both days. Brief luncheon addresses are scheduled for Monday by Pressly H. McCance, president, Duquesne Light Co., and on Tuesday by Robert B. Donworth, Duquesne's vice-president in charge of engineering and construction.

To Inspect Shippingport

On Wednesday, May 1, an inspection tour of the Shippingport atomic power plant of the host company is planned and for those who desire, arrangements may be made to visit purchasing and stores operations of the host company.

On Monday, April 29, following an invocation, opening remarks by Chairman E. N. Scott, Long Island Lighting Co., and the welcome by Mr. Flegler, the program will include a presentation on the pros and cons of the use of much wider competition. This will bring out the current thinking on the extent to which utilities invite competition from a wide field as opposed to limiting the distribution of business to a relatively small number of suppliers and the reasons for widening or limiting the field, will be explored. A project on how to cut costs in the issue and return of stock material will follow, which will explore and report on the practices used by utilities in reducing paper work and physical handling in connection with the issue and return of material. Discussion from the session floor will follow the presentation of each subject.

At the afternoon session a project will be presented on manufacturers' packaging techniques, including palletization and disposable containers.

Many manufacturers either on their own initiative or at the request and with the cooperation of utilities served have developed methods of packaging material which can save manpower in receiving, storing, and disbursing. This project will report on these methods and make an evaluation of the economies of such practices. Progress reports will also be made by the sub-committee on standard packaging and nomenclature and on the subjects of the measures of stores performance and developing fly ash outlets.

On Tuesday, April 30, the morning session will include presentations and discussions on the handling methods related to specific materials and the effective use of lead time. The first subject will consist of a slide illustration and explanation of the various means and equipment used by utilities in physically handling and storing some of the materials which, by their nature, are not easily handled by conventional means. The second subject will deal with current practices of member companies as regards the form and timing of the transmittal of requirement information to the Purchasing and/or Stores Department on various classes of material and of the transmittal of lead time information to requisitioning departments by the Stores Department.

The afternoon program will consist of a panel discussion on current practices and problems in stores and purchasing. The subjects which the panel will discuss include problems of receiving, storing, disbursing and accounting for gasoline; how to prevent an accumulation of inactive stock and dispose of surplus and used equipment; storage and accounting for stationery supplies and what is the reasonable cost of carrying inventory. Purchasing subjects which the panel will develop include insurance contracts (formal contracts versus purchase orders); blanket orders; relations between purchasing personnel and sales representatives and a critique of a previous session subject on the pros and cons of the use of much wider competition. Audience participation will be encouraged.

A dinner will be held on Monday evening as part of the annual meeting program and the group will be entertained by the nationally known Westinghouse Male Chorus. For the ladies who may attend the annual meeting an interesting tour, program and luncheon arrangement is being worked out for Monday, with an additional short afternoon tour to the University of Pittsburgh on Tuesday.

Rotor Prewarming

(*Continued from Page* 81)

have had one test failure because of this phenomenon. We are concerned with the possibility of prewarming of field rotors and with the effect of "bottling up" machines for short outages causing accelerated girth-cracking or tape-separation. We have expressed our concern to the manufacturer's engineers and we hope that their consideration of this problem will soon result in a decisive statement in respect to this.

Conclusions: We feel that the regulation of cooling water prior to shutdown provides a reasonably satisfactory method of maintaining rotor forging temperatures close to the objective value for short shutdown periods of the order of a day.

For longer shutdown periods, it would appear that prewarming by operation of the machine at about half speed provides the only safe method at present. Permanent installation of direct coupled excitation systems will cost about $60,000. We do not favor this method because of the three to five hours' delay in synchronizing a machine after the boiler is ready for service.

Investigations of other methods will continue in an attempt to obtain a method which will permit quick starting and yet maintain the objective rotor body temperatures.

Prime Movers Committee Meeting

By J. M. Driscoll, *Chairman*

THE Prime Movers Committee on invitation of its members from the Columbus and Southern Ohio Electric Co. and the American Gas & Electric Service Co. selected Columbus, Ohio, as the location for its mid-winter meeting. Convening from Feb. 4-6, at the Deshler-Hilton Hotel, the well attended sessions were devoted to the customary review of subcommittee activities and round table consideration of a large number of steam station design and operating topics.

Following a schedule adopted in October, 1956, the meeting of the first day adjourned at 4 p.m. to allow the 13 subcommittees an opportunity to meet before the subcommittee report session of the morning of the following day. The Monday and Wednesday sessions were largely devoted to round table discussion with a field trip being taken to inspect the first supercritical power station installation at the Philo Plant of the Ohio Power Co. on Tuesday afternoon.

The Committee was welcomed to Columbus by J. L. McNealey, vice president in charge of operations of the Columbus and Southern Ohio Electric Co. Mr. McNealey called attention to the success of the industry's steam power generation engineers in reducing production costs in the face of rising material and labor expenses. This has resulted in part, Mr. McNealey said, by the forums for the exchange of information provided by the Committee.

McLennan Welcomed

At the Columbus meeting the Committee welcomed J. A. McLennan, Southern Services, Inc., a newly appointed member succeeding E. C. Gaston who has resigned since the last meeting on being named president of Southern Services, Inc. The Committee expressed its appreciation of the work that Mr. Gaston had done during his term of membership.

On noting personnel changes the Committee was saddened with the absence of Dr. A. E. White, consultant, who had been a guest of many years of the Prime Movers Committee and who had represented the EEI on several national technical organizations. Dr. White died after the Committee's last meeting. At the time of his death he was a member of the Metallurgy and Piping Task Force. A resolution was unanimously passed paying tribute to Dr. White and to his accomplishments in the field of metallurgy for the benefit of the electric utility industry.

The growing interest of the Committee in the round table discussion periods of its meeting is indicated by the continually increasing agenda compiled from topics and reports submitted by the members. An unprecedented list of over 150 questions was prepared by V. L. Stone, Commonwealth Edison Co., vice chairman of the Committee, who conducts the round table period.

Round Table Discussion

The round table discussion occupied all of the sessions with the exception of the greater portion of the Tuesday morning session which was taken up by subcommittee reports and Tuesday afternoon when the Committee visited the Philo Station. During the round table period several members reported on operating problems encountered in the starting up of new units. Approximately thirty questions were concerned with the design and operation of steam turbines and another thirty topics were based on boiler practices. In addition, some 100 topics on auxiliary equipment and general power station subjects were discussed.

Prime Movers Committee subgroups have been organized to keep the Committee apprised of developments in fields related to power generation of interest to the members. One of these important groups, the Air Pollution Subcommittee, is chairmanned by W. C. Beattie, Consolidated Edison Co. of New York. This Subcommittee's report advised of the actions of several engineering groups concerned with this subject and called attention to proposed legislation in several states concerning air pollution. As a part of the Subcommittee's report, T. M. Hotchkiss of the Southern California Edison Co. informed the Committee of developments in research work being sponsored by that company.

R. W. Parkinson, Commonwealth Services, Inc., chairman of the Boilers and Combustion Subcommittee, reported on the status of 10 projects underway by that group. This Subcommittee is investigating practices and experiences with controlled circulation boilers, pressure fired boilers, outdoor boilers, and supercritical pressure boilers. It also is preparing reports on six additional timely subjects of interest to power station engineers.

The Turbines and Condensers Subcommittee covers an area of particular importance to steam power generation. Under the direction of V. F. Estcourt, Pacific Gas & Electric Co., it is considering a number of subjects of which turbine outages, rate of load pick-up and turbine heat rate deterioration are outstanding. Because of the wide range of subjects considered by this Subcommittee, it has been particularly active in preparing reports for the Committee.

M. D. Engle, Pennsylvania Power & Light Co., chairman of the Fuel and Ash Handling Subcommittee, presented a progress report on an investigation that this group is conducting regarding the disposition and use of fly ash with the ultimate end of informing the Engineering and Operating Division Executive Committee of the status of this subject. The Subcommittee is concerned with the economics of fly ash disposal and also keeps the Committee advised of possible disposal sources of the future.

Atomic Power Session

J. N. Landis, Bechtel Corp., with E. M. Parrish, Duquesne Light Co. and other members of the Atomic Power Subcommittee, presented an atomic power session. On arrangements by Mr. Parrish, W. H. Wirth, health physicist, Shippingport Power Station, Duquesne Light Co., presented a paper entitled "Radiation Safety Plans for Shippingport." This was followed by a run-down by F. W. Argue, Stone & Webster Engineering Corp.; W. C. Beattie, Consolidated Edison Co. of New York; W. W. Brown, Detroit Edison Co.; M. D. Engle, Pennsylvania Power & Light Co.; D. C. Hormel, Pioneer

Service & Engineering Co.; F. S. Helfter, Niagara Mohawk Power Corp.; T. M. Hotchkiss, Southern California Edison Co.; A. E. Kirschner, New England Power Co.; J. J. Walsh, Sargent & Lundy; W. G. Lauffer, Ebasco Services, Inc.; F. F. Mautz, Pacific Gas & Electric Co.; E. M. Parrish, Duquesne Light Co.; and V. L. Stone, Commonwealth Edison Co. of the atomic power projects in which their companies are participating.

The largest of the Prime Movers Committee's sub-groups is the Power Station Chemistry Subcommittee. W. L. Jackson, Public Service Electric & Gas Co., chairman of this group, advised that a new section will report to the Subcommittee on developments in stream pollution of interest to electric utility companies. The new section is under the direction of R. G. Call, American Gas & Electric Service Co.

Subcommittee Disbanded

The Committee accepted the report of its Power Station Cost and Performance Data Subcommittee in which attention was called to the completion of several recent studies regarding production plant economics. On recommendation of the Subcommittee that the studies not be repeated for a period of two or three years, the Subcommittee was disbanded with thanks. E. C. Cawrse, Cleveland Electric Illuminating Co., has served as chairman of this group.

In addition to subcommittee reports, the progress of several research programs sponsored by the Prime Movers Committee or to which the EEI contributes funds on recommendation of the Committee, were reviewed. R. A. Baker, Public Service Electric and Gas Co., who represents the Prime Movers Committee on the ASTM-ASME Joint Committee on Effect of Temperature on the Properties of Metals, reported on recent developments of that organization, and T. T. Frankenberg, American Gas & Electric Service Co., who follows the ASME High Temperature Steam Generation Project for the Prime Movers Committee, reported on the status of that program. In the absence of R. M. Van Duzer, Detroit Edison Co., who is a member of the ASME Research Committee on Properties of Steam, A. C. Pasini, Detroit Edison Co., representing Mr. Van Duzer, filed a report on the progress of the ASME research program to extend the steam tables.

F. W. Argue, Stone & Webster Engineering Corp., chairman of the Steering Committee of the research program on the problem of iron oxide depositions in high pressure, high temperature steam power cycles, advised that this project had been terminated.

During the past three years this program has been sponsored by the Prime Movers Committee. In his report, Mr. Argue reviewed this project which was originally planned to comprise two phases. The first was to determine the rate controlling factors in the corrosion of iron in water to form magnetic iron oxide. This phase was based on experimental evidence that ferrous hydroxide is an important intermediate step in the corrosion reaction. The second phase was planned to be an attempt to develop effective control measures. The project was conducted at the Battelle Memorial Institute.

Mr. Argue pointed out that an answer to the first phase has been obtained with the results of the project indicating that the corrosion reaction is not controlled by the decomposition of ferrous hydroxide. Although the result is a negative answer it is, nevertheless, an important contribution to the knowledge of this complex problem. Based on the finding and in view of the short time remaining in the contract period, the Steering Committee entered a recommendation that this work be terminated.

The appreciation of the Committee was extended to Mr. Argue and the Steering Committee of this project. The Power Station Chemistry Subcommittee was assigned to immediately review by means of a brief questionnaire the status of the problem of iron oxide depositions and any tests or research programs being conducted on the subject by the companies represented on the Subcommittee. After determining the status of the problem at present and the activities of companies in the direction of its solution, the Subcommittee will report to the Prime Movers Committee at its May meeting. This report will be used as a basis to determine the advisability of continuing research in this area.

The meeting in Columbus allowed the Committee the opportunity of inspecting the Philo Station of the Ohio Power Company. Arrangements were made by T. T. Frankenberg, American Gas & Electric Service Co. for the Committee to journey to the plant at Zanesville, Ohio, and, following an informative session in the plant's Conference Room, to inspect that plant.

The next meeting of the Prime Movers Committee is scheduled to be held May 6-8, at St. Petersburg in Florida.

Recent EEI Publication

Farm Electrification Research

EEI Pub. No. 56-15. Third Edition of Special Studies and Research Activities Contributed to or Conducted by Electric Operating Companies—Jan. 1, 1951-Dec. 31, 1955. Compiled by the Farm Group, Commercial Division. 60 pages. Price: $1.25.

This report summarizes briefly 222 separate research projects or special studies receiving support or sponsorship from electric companies in 87 different categories. Discussed in the booklet is the effectiveness of electric application to such varied fields as bean drying, calf pen heating, egg collection, cooling and counting, farm freezers, irrigation, nematode electrocution, plant propagation, automatic smoke house, tobacco curing, insect control, irrigation, poultry house ventilation, poultry feeders, processing, water warming and wiring.

Reports were received from 29 states and Canada. In addition to activities of individual electric operating companies, reports were submitted regarding work being conducted by 28 land grant colleges or universities. At these institutions the research work reported is sponsored by electric operating companies and/or state farm electrification committees or councils, utilities' associations, etc., made up wholly or in part of personnel from electric operating companies and/or colleges or universities, manufacturers, REA co-ops, farm organizations, etc.

Transmission and Distribution Committee Meeting

By G. H. Fiedler, *Chairman*

THE winter meeting of the Transmission and Distribution Committee was held on Feb. 7 and 8 at the Netherland Hilton Hotel in Cincinnati, Ohio.

There were 205 members and guests in attendance at this meeting.

General Engineering

The opening session was sponsored by D. Burns, Chairman of the General Engineering Subcommittee.

H. W. Grate outlined remedies applied to five cases of industrial plant trouble due to momentary voltage dips as reported to the Task Force on Voltage Dips and Short Service Interruptions.

A. T. Green discussed factors leading to the first use of multiple circuit street lighting in Buffalo. About 700 replacement poles and luminaires in the downtown area now are being supplied from the underground secondary network system. Among reasons for the change were the high cost of conduit and transformer facilities in the downtown area, non-coincidence of the street lighting load and the network system summer peak, the use of mercury vapor lamps and the low voltage, simplicity and greater reliability of multiple circuits.

C. E. Bathe, Oklahoma Gas and Electric Co.; P. B. Boyd, Georgia Power Co.; E. A. Fisher, Union Electric Co.; H. W. Grate, Cincinnati Gas & Electric Co.; R. M. Grogan, Long Island Lighting Co.; C. F. Mitchell, Commonwealth Edison Co.; T. D. Thomas, Texas Power & Light Co.; and W. J. Witte, Baltimore Gas and Electric Co., participated in a panel discussion led by J. W. Anderson concerning the motor starting current voltage flicker problem, particularly as associated with integral horsepower air conditioners being installed increasingly in residential areas.

The majority felt that experience has shown that criteria for acceptable voltage flicker established a number of years ago still are valid. It was generally agreed that the industry standard single-phase motor starting current rules need to be extended to specify values which will be generally acceptable for integral horsepower equipment but there were varied opinions as to how this should be done.

Underground

The second session was sponsored by T. C. Duncan, Chairman of the Underground Subcommittee.

E. F. Nuezel reported a favorable letter ballot on proposed "EEI-NEMA Standards for Secondary Network Transformers" which now will be prepared for printing.

H. L. Davis, Jr. stated that performance data from the major users of paper and lead, duct-lay cable above 7.5 kv show a trouble rate of 9.2 per 100 cable miles in 1955 as compared with 7.9 in 1954. This continues a general trend of gradually increasing trouble rates over the past 11 years. Mechanical damage and corrosion accounted for 45 and 20 per cent of the troubles, respectively.

J. A. Pulsford reported that the new "Underground Systems Reference Book" is completed and will be available in a few weeks. He also reported a favorable letter ballot on the proposed "Guide for Loading Network Protectors" which now will be released for printing.

W. H. Lohman discussed methods of locating leaks in low-pressure gas-filled cable. The Public Service Electric and Gas Co. prefers a shifting feed or flow meter method for localization and frozen oil stops for final determination. Freon 12 or radioactive tracer gases are considered promising alternatives but only Freon 12 is being used sparingly as a confirming check until the effects of tracer gases on cable insulation are more definitely established. D. C. Hawley reported that the Kansas City Power & Light Co. utilizes a flow meter to localize leaks and ethyl mercaptan as a tracer for final determination.

A report by R. W. Gillette indicated that Consolidated Edison Co. tests show that either 10 per cent helium or 10 per cent Freon 12 tracers are adequate for locating leaks. However, the use of helium involves the use of a cumbersome mass spectrometer and cable insulation tolerance for low concentrations of freon are not established. E. J. Merrell reported that Phelps Dodge Copper Products Corp. accelerated load cycle aging tests on gas-filled cable show that freon and sulfur-hexafluoride have deleterious effects on the insulation but that helium is harmless.

C. E. Burfield described the insulated aluminum bus recently adapted by the Consolidated Edison Co. for use in network transformer vaults. The 4″ by 6″ by ⅜″ integral web extruded channel weighs about 54 per cent of the equivalent square copper tube and its form permits the application of insulation without interfering with ventilation. The insulation is a melamine impregnated cotton base molded laminate which is snapped onto each side of the channel.

T. C. Duncan presented a movie showing installation of the 138-kv submarine cable crossing the East River in New York City.

Standards and Specifications

M. H. Powell, Chairman of the Standards and Specifications Subcommittee, called on task force chairmen for progress reports.

C. E. Topping reported that approved revisions of TD-4, "Specifications for Eye Bolts," TD-6, "Specifications for Steel Crossarm Braces," TD-17, "Specifications for Bolt Type Steel Insulator Pins," and new TD-24, "Specifications for Porcelain Wireholder," are about ready to be released for printing. Work on several other proposed new and revised line hardware specifications is progressing satisfactorily.

F. A. Ashbaugh announced a favorable letter ballot on the proposed revision of TD-91, "Specifications for Dense Southern Pine Crossarms, Preservative Treated." Proposed new specifications for heavy duty Douglas fir crossarms, heavy duty Douglas fir braces, wood pins and a proposed revision of TD-100, "Specifications for Full Length, Non-Pressure, Preservative Treatment of Poles," now are ready to be submitted for ballot. Efforts to develop an industry standard for pole framing are continuing.

F. E. Sanford reported that the fundamental research on aluminum conductor fittings being conducted by

Armour Research Foundation is progressing satisfactorily and is due for completion this year.

H. MacVaugh stated that the Aluminum Conductor Compression Tools and Fittings Working Group tests on a series of proposed standard die cross sections for compression sleeves for full-tension splices is progressing according to schedule. No serious difficulties are evident although a considerable amount of time will be needed to complete the test program.

A. T. Green announced publication of the following new EEI-NEMA Standards for Street Lighting Equipment: TDJ-137 Steel Luminaire Supports for Wood Poles; TDJ-138 Film Cutouts; TDJ-140 Metal Head and Reflector Interchangeability (Revision); TDJ-141 Insulator Head and Reflector Interchangeability.

Overhead

H. L. Livingood, Chairman of the Overhead Subcommittee, sponsored a session covering varied subjects.

D. F. Tulloch described results of the first test run of the storm tracking plan recently established on a trial basis among 33 eastern companies represented on the Committee.

E. S. Bennett of the U. S. Weather Bureau outlined facilities and services available to aid in obtaining maximum warning and details concerning severe storms.

P. J. Berger reviewed Cincinnati Gas and Electric Co. practices and experience with southern pine poles. Processing is supervised closely at every stage from woods to pole line. Important steps include rapid movement of felled poles to trimmer, followed by immediate application of fungicide; accelerated air seasoning in cross ventilated, roofed storage piles; moisture determination by electrical resistance method during seasoning and individual final inspection and electrical resistance measurement just before preservative treatment. Recent field inspection of poles in service for 20 to 24 years failed to reveal any unsound poles. Within the entire group of 138,000 poles in service there have been only three decay removals, two of which were still serviceable.

A. A. Hall, Jr. described Baltimore Gas and Electric Co. experience in bad tree areas with vinyl-covered, open-wire, 4-kv primaries using vertical spacers. About 87,000 circuit feet have been installed during the past two years in lieu of preassembled aerial cable on the less important circuits. The arrangement consists of a copper clad messenger neutral with heat-sealed vinyl-covered phase wires in a vertical configuration below. Plastic spacers are installed in the span at intervals of 35 to 45 feet.

D. R. Forger outlined Connecticut Light and Power Co. operating experience with unit street light controls. The use of this type control was initiated in 1949 on the basis of lower installation cost. Maintenance costs were higher at the beginning of the program but now are comparable to or lower than those for the series type system.

Safety

The closing session was sponsored by W. J. Witte, Chairman of the Safety Subcommittee.

C. Trout and F. Pinckard outlined the safety program of the Cincinnati Gas and Electric Co. Mr. Trout described the safety rules employed on the overhead and underground systems and the procedures for accident reporting and analysis. Training includes monthly district meetings for all employees, 10-day accelerated training courses for linemen and splicers, a two-week supervisor's indoctrination program and a field demonstration truck for training on specific items.

F. Pinckard stressed the importance of standard work methods as an essential part of this safety program. Initially, tentative standard procedures were developed by selection from field observation of existing practices. Following trial these then were reviewed by all crew foreman at district meetings and resulting comments were submitted to a central committee for final decision. They still are refined and revised by the same process.

F. M. Cox discussed responsibility for safety, particularly as applied to overhead line operations. He attributed the general improvement in the overhead line safety record in recent years to increased safety consciousness sparked by top management and ultimately transmitted to all operating levels. He emphasized the engineer's responsibility to provide construction specifications which will promote safe operation, warning of design based solely on economy.

Safety Merit Awards Go to 17 Companies

SEVENTEEN EEI Safety Merit Awards were presented to member companies between Jan. 1 and Feb. 28, 1957, for completing 1,000,000 or more man-hours of operation without a disabling accident.

Two 3,000,000 man-hour Awards were presented during this period. Wisconsin Public Service Co. reached the 3,304,912-hour mark and The Detroit Edison Co. achieved a record of 3,300,000 hours without accident. The Flint division of Consumers Power Co. and the Owosso district of the Flint division each passed the 2,000,000-hour mark without accident.

The companies receiving certificates in this two-month period are:

Company	Man-Hours
Alabama Power Co.	
Construction Department	1,534,382
Cincinnati Gas & Electric Co.	
Electric Production Department	1,002,106
Electric Distribution Department, Engineering & Planning Section	1,000,000
Consumers Power Co.	
Entire Company	1,692,401
Flint Division—Owosso District	2,007,675
Flint Division	2,104,128
Commonwealth Edison Co.	
Powerton Station	1,000,000
Testing Department	1,000,000
Harvey Electric Operating	1,000,000
The Detroit Edison Co.	
Entire Company	3,300,000
Duke Power Co.	
Entire Company	1,109,464
Kansas Gas & Electric Co.	
Entire Company	1,118,411
Southern California Edison Co.	
Northern Hydro Generation Division	1,107,809
Entire Company	1,527,866
Superior Water Light & Power Co.	
Entire Company	1,109,464
Virginia Electric & Power Co.	
Richmond District	1,163,652
Wisconsin Public Service Co.	
Entire Company	3,304,912

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Accident Prevention Committee Meeting

By Raymond W. White, *Chairman*

THE Accident Prevention Committee held its 62nd meeting in Hartford, Conn., Nov. 26-28, 1956, with an attendance of 88 members and guests. Reports were given by 26 Subcommittees and liaison representatives.

Two addresses on the subject of atomic energy were given. The first was by William F. Wirth, health physicist, Shippingport Power Station, Duquesne Light Co., Pittsburgh, Pa., on the subject of "Radiation Safety Plans at Shippingport." The second was by H. J. Cadwell, president of Western Massachusetts Electric Co., on "The Planning and Development of Yankees' Nuclear Plant." An excellent address on the subject of "What's New in Safety" was made by C. L. Derrick, operating vice president, Hartford Electric Light Co. In addition, two short motion pictures on atomic energy safety planning were shown. One of the films was secured from the Atomic Energy Commission and entitled "Safety Experiments With a Boiling Reactor." The other film was released by General Electric and deals with basic radiation and personnel protection problems.

Resuscitation Report

A report by W. C. Bremner for the Resuscitation Subcommittee was given and semi-final draft of the proposed Resuscitation Manual was distributed.

Dr. W. B. Kouwenhoven of the School of Engineering of The Johns Hopkins University made a progress report on the research project being conducted under the auspices of the Accident Prevention Committee on the subject of "Resuscitation by Electric Shock." Comment was then made concerning the forthcoming meeting of the Resuscitation Subcommittee with the newly appointed Medical Task Force. The latter has been assigned the responsibility of reviewing the Resuscitation Manual and electrical resuscitation research experiments. A meeting of this group was subsequently held at The Johns Hopkins Hospital, Baltimore, Maryland, on Nov. 30. This meeting was attended by six doctors of the Medical Task Force, members of The Johns Hopkins Hospital and Engineering Staff, representatives of the Resuscitation Subcommittee, and officers of the Accident Prevention Committee.

A series of successful experiments with the guests participating were demonstrated on dogs, indicating perfection of a defibrillating device which showed good results where the electric resuscitating shock was applied within two minutes following the onset of fibrillation in the dogs.

Saunders is Elected

Dr. L. W. Saunders of Baltimore, Md., was elected chairman of the Medical Task Force and has subsequently delegated responsibility of the various fields of investigation to other medical members of the Medical Task Force. These doctors will cooperate closely with the Resuscitation Subcommittee and seek to provide the Accident Prevention Committee with a comprehensive medical review of the Resuscitation Manual and the project for electric resuscitation to overcome ventricular fibrillation following electric shock.

A comprehensive report on 1956 accident frequency and severity figures for the electric utility industry was presented by F. G. Harriman, chairman of the Accident Statistics Subcommittee. This report predicted a final frequency of 6.95 lost time hours per million manhours worked and severity of 1310 days lost per million manhours worked for the electric utility industry for the year 1956. This was compared with the figures for 1955 as follows: Frequency of 7.62 and severity of 1519.

Approval of the Committee was given to the final draft of the Linemen's Climbing Equipment Specifications and R. E. McCann, chairman of this Subcommittee, was authorized to have the final draft printed and released.

S. H. Young, chairman of the Analysis of Fatalities Subcommittee, submitted a final report for the year 1955 giving a detailed analysis of the 122 fatalities and the causes therefor. The pattern evidenced in this report was approximately the same as during the past 9 or 10 years with electric shock and burn accidents composing the largest percentage and falls coming next.

Further discussion by the Committee and Advisory Committee was devoted to the subject of streamlining its activities and approval was given to the release of a "Handbook for Officers and Committeemen" to be distributed prior to or at the next meeting of the Committee which is scheduled for April 29-May 1. This project continues to evidence considerable promise for further accomplishments with minimizing of effort by members of the Accident Prevention Committee. The elimination of certain interim reports for various subcommittees was agreed upon. Future development of the Committee's participation in atomic energy accident prevention activities and in the preparation of inspirational articles for release to trade magazines on the subject of electric utility accident prevention were implemented.

New Round Table Talk

A renovated version of the Round Table Discussion, which has been so popular, was presented under the auspices of A. J. Naquin, chairman of the Round Table Subcommittee, and further enhanced the value of this medium to the safety representatives attending. The new procedure provides for written answers being distributed to the persons initiating the inquiry and for final reproduction of the summary of answers to be printed in the minutes of the meeting.

Further coordination of the Committee's activities with those of the National Safety Council and American Gas Association Accident Prevention Committee was discussed and agreed upon.

The Committee approved the final release of a film by the Visual Aids Subcommittee headed by E. S. Robertson as chairman. This film is entitled "The Death of a Lineman."

A questionnaire prepared by the Protective Equipment Subcommittee,

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Accident Prevention Committee Meeting

(*Continued from Page* 93)

headed by C. A. Coutts, chairman, was approved and will be mailed to member companies. This questionnaire is quite comprehensive in scope and is designed to elicit information on current practices for the use of protective equipment for electrical workers.

Approval by the Committee of the proposed ASA Specifications for Low Voltage Gloves J6.7 was given to I. R. Dohr, chairman of this Subcommittee. Approval was also given for the proposed modification of ASTM Specification D120T on the subject of Linemen's Rubber Gloves.

Considerable discussion was devoted to the proper methods of uniform reporting of accident statistics and a special study group composed of Ralph Hanford, O. P. Stamstad, R. H. Coleman, and F. G. Harriman was asked to make a report on this subject at the next meeting of the Committee.

Tentative plans were made for a Round Table Conference during 1957 or 1958 to be sponsored by the Committee on the subject of accident prevention.

During the Committee's visit to Hartford, Francis Payne of Connecticut Power Co. and Raymond W. White of Pacific Gas and Electric Co. participated in a television program sponsored by the local electric utility companies. They publicly discussed the activities of the Committee and emphasized the remote chance of reactor accidents because of the many safeguards which the industry and the Atomic Energy Commission are endeavoring to take for the protection of employees and the public in the development of atomic energy power production.

Delegates to 25th Annual EEI Convention, Chicago, June 3-5:

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'I Want to Know About Electric Industry' Published in Ninth Annual Edition

THE 1957 edition of "I Want to Know About the Electric Industry" has just been published by Edison Electric Institute. Beginning with this edition, the date of publication has been set early in the year of issue so that preliminary figures for the preceding year may be included where available, giving more nearly current data in many instances. With the late autumn publication data of past editions, this data was not always at hand.

In addition to the latest available figures, estimates of future prospects are given when appropriate. A new question on atomic energy in this edition—ninth in the series—brings to 29 the total number of questions which the booklet answers broadly and with considerable supporting statistical data.

The new booklet shows that for the electric industry 1956 was a year of increased growth, new achievements and records. Covering those aspects of the electric industry in which the greatest general interest has been shown, the answers to the 29 questions reveal that:

The average residential customer used 2969 kilowatthours of electricity in 1956; the industry has budgeted $3.77 billion for expenditure during 1957 for new plant and equipment; taxes, the biggest single item of expense of investor-owned electric companies in 1956, represented 23.8 per cent of total electric revenues.

In both text and tabular form, the book presents data on the recent growth of capacity and production, the investments in new facilities which made this growth possible, and the present plans for continued expansion. There is also a discussion about the prospects for utilizing atomic energy in the production of electricity, and what has been done to date by the investor-owned electric companies in this field.

The questions range from such broad subjects as "How Does the U. S. Rank in World Production of Electricity?" and "How Do Expansion Investments Compare with Other Industries?" to such topics of immediate interest to the individual consumer as "What About Electricity and the Family Budget?" and "How Many Electrical Appliances Work for U. S. Families?"

The use of electricity in the home, on the farm and in industry and commerce, a comparison of steam and water power generation, fuel consumption, the sources and disposal of revenues, and the ownership trend in new generating capacity are all broadly covered. Taken together, the questions and answers present a comprehensive, accurate and up-to-date picture of the electric industry's past growth and its potential.

Notes on 25th Annual EEI Convention, Chicago, June 3-5

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p.m. Sunday, and from 8:30 a.m. to 5 p.m. Monday, Tuesday, and Wednesday.

The Convention registration fee of $15 will cover admission to all business sessions and social functions. Identification for admission to these events will be by badges for the gentlemen and pins for ladies, both obtainable only upon registration.

The Palmer House was selected as convention headquarters because of its central location within the city and because of its large housing capacity and excellent auditorium. About 1400 bedrooms and 90 suites will be available at that hotel for convention delegates and substantial accommodations have been set aside at the Conrad Hilton.

Prospective delegates are urged to secure hotel reservations as soon as possible due to the expected large attendance. Institute headquarters has mailed hotel reservation blanks to all member companies. Additional copies may be obtained upon request from Edison Electric Institute, 420 Lexington Avenue, New York 17, N. Y. All applications for reservations should be sent to E. M. Langford of the Convention Housing Bureau, c/o The Palmer House, Chicago, Ill., for reservations at either of the two hotels.

Personals

Hall M. Henry was recently elected president of the New England Gas & Electric Association, succeeding the late **Ralph D. Stauffer. Harding U. Greene** was elected vice president of NEGEA Service Corp. and **Harold W. Atkinson** was appointed general manager of Cambridge Electric Light Co., a NEGEA subsidiary. Mr. Henry has been with the system since 1938 when he was named assistant to the president. He rose to vice president of the service corporation and director of system gas operations. He is currently vice president of gas subsidiaries in Cambridge and Worcester. Mr. Greene obtained an electrical engineering degree from Columbia University. In 1923 he went to Cape & Vineyard Electric Co. and later became its general manager. He transferred to Cambridge in 1927, where he became general manager. He will continue as vice president of the Cambridge utility, a position he has held since 1939. He is a member of the technical liaison committee of the Yankee Atomic Electric Co. Mr. Atkinson has been assistant general manager of Cambridge Electric Light Co. since 1953. He joined the company as power sales engineer in 1935, the year he received his M.S. from Harvard Business School.

John J. Burke was elected president of Pacific Northwest Power Co., succeeding **Kinsey M. Robinson,** president and board chairman of Washington Water Power Co. Mr. Robinson was elected board chairman of PNP. Pacific Northwest is an organization of four utilities—Pacific Power & Light Co., Portland General Electric Co., Montana Power Co. and Washington Water Power Co. Mr. Burke is chairman of the board of Metals Bank & Trust Co. of Butte, Mont., and has been a WWP director since 1952. He entered the banking field in 1919. He was elected president of Metals bank in 1945 and was named board chairman last year.

A. Clay Stewart and **William A. Duncan, Jr.,** recently were elected vice presidents of Kentucky Utilities Co. Mr. Stewart had been assistant to the president of the company since 1951 and Mr. Duncan had been assistant vice president since 1954. Mr. Stewart has been with Kentucky Utilities and a predecessor since 1927. He served in the accounting, treasury, and statistical departments until 1930 when he became chief of the general office statistical department. In 1947 he was promoted to executive assistant. Mr. Duncan joined the company in Paducah in 1935 after receiving a mechanical engineering degree from the University of Kentucky. He was division commercial service engineer in several districts until 1937 when he was promoted to assistant division engineer at Paducah. In 1941 he became a regular member of the general office engineering department at Lexington. Mr. Duncan was promoted to system planning engineer in 1953.

C. C. Herrmann, vice president, accounts and finances, Wisconsin Power & Light Co., recently was named vice president and treasurer of the company. He succeeds **Otis Gerke,** treasurer, who died last December. **James R. Underkofler** becomes an assistant treasurer. He had served as an administrative assistant. Mr. Herrmann is a graduate of the University of Illinois in business administration. He joined the financial department of Middle West Utilities Co., Chicago, in 1924. Subsequently he served with the Central and South West Utilities Co., San Antonio and Dallas, returning to Middle West in 1932. He joined Southwestern Gas and Electric Co., Shreveport, La., as controller in 1942, where he remained until he came to Madison with the Wisconsin company in 1953. Mr. Underkofler was graduated from the University of Wisconsin School of Law in 1950. He was a part-time employee of WP&L before that time.

R. E. Doyle, Jr., vice president and general manager of the Kentucky Power Co., has been named vice president and assistant general manager of Indiana and Michigan Electric Co. Succeeding Mr. Doyle as Kentucky Power vice president and general manager is **F. M. Baker.** Mr. Doyle, a graduate of Virginia Polytechnic Institute, had been with the Kentucky utility since 1930. After serving as construction engineer he rose to general manager in 1948 and was elected to the company's board of directors and to the vice presidency in 1952. Mr. Baker earlier this year was named assistant general manager of the company. A Massachusetts Institute of Technology graduate, he joined Kentucky Power in 1931 as an engineer and subsequently was appointed Pikeville general manager.

J. Ernest Doolittle was elected vice president in charge of commercial relations of Central Hudson Gas & Electric Corp., succeeding **Harris E. Dexter,** who was retired March 1. A veteran of more than 33 years service with the company, Mr. Doolittle has served as assistant vice president of the company since 1954. He came to Central Hudson in 1923 as a cadet engineer at Poughkeepsie, after graduation from Rensselaer Polytechnic Institute. In 1924 he was transferred to the company's Kingston operating district and was advanced to the position of operating superintendent of the Beacon district two years later. He returned to Poughkeepsie in 1927 as division commercial manager and remained in that post until 1929 when he was appointed Poughkeepsie district manager.

Arthur W. Wallander, assistant to the president of Consolidated Edison Co. of New York, Inc., and chairman of the company's Central Safety Committee, retired March 1. Mr. Wallander joined Con Edison in 1949 after a distinguished career with the New York Police Department in which he rose from the uniformed ranks to serve as commissioner under two mayors. His first-hand traffic problems equipped him for his first Con Edison assignment—to coordinate the efforts of various operating groups in developing uniform street-work practices to provide for maximum safety for work crews and the public. The resulting Planned Work Area Program became a model for the country.

Four executive promotions, including the election of **J. William Bennett** as vice president in charge of engineering, have been announced by Western Massachusetts Electric Co. **Marlowe G. Moses** is the new chief engineer; **Harold Perry** becomes general purchasing agent and **Russell D. Purrington** was appointed superintendent of steam production in the Springfield area. Mr. Bennett joined the company in 1930 as engineer in charge of underground distribution and transmission design and later rose to assistant chief engineer. He has been chief engineer since 1944. During this period he was responsible for the design of the downtown underground network system in Springfield and design and construction supervision of the new West Springfield steam plant.

Mr. Moses, assistant chief engineer since 1946, came to WME in 1945 as system planning engineer. Before that he was with Northwestern Service Corp. as an electrical engineer and with Northern States Power Co., as planning engineer and later as assistant manager of that department. From 1942 to 1945 he was on special assignment as a research associate at Harvard University in military research and manufacturing programs sponsored by the National Defense Research Committee.

Mr. Perry, succeeding **Ralph A. Benjamin** who retires in May, will also retain the position he has held since 1950 as superintendent of the West Springfield station. A graduate of Worcester Polytechnic Institute, Mr. Purrington has been with the company since 1934.

Three executive appointments and two retirements have been announced by Pacific Power & Light Co. **Roy Vernstrom,** general sales manager, was named assistant general manager, Northwestern division, succeeding **Ed F. Pearson** who recently retired. **Frank M. Reis,** commercial sales manager, becomes acting sales manager. **Deskin O. Bergey** was appointed assistant general manager of the Coast division, succeeding **Lloyd W. Edwards** who has retired. Mr. Vernstrom joined the company in 1947 as advertising manager and served successively as executive assistant to the president, assistant general manager for the Oregon area outside Portland and as general sales manager. Mr. Pearson served 45 years with Pacific Power & Light. As chief engineer in 1930, he supervised the design of what then was the world's highest voltage submarine power cable—the 115,000-volt underwater line across the Columbia River between Portland and Vancouver. He transferred to executive and administrative work in 1938. Mr. Reis joined the company in 1938 as a commercial salesman and later became lighting sales director in general sales. Mr. Bergey has been with the company 22 years and was Coos Bay district manager from 1954 until his present appointment. Mr. Edwards had been in the utility business 37 years, beginning in 1919 with the old Coast Power Co. in Tillamook, Wash., operated and owned principally by his father. When Coast Power was acquired by the former Mountain States Power Co. in 1925, Mr. Edwards joined that organization. He remained with Mountain States until it merged with Pacific Power & Light in 1955.

Promotion of **W. B. Shenk** to general sales manager of Florida Power Corp. and of **M. F. Bunnell** to manager of industrial relations has been announced. Mr. Shenk has been director of commercial and industrial development since 1954 and Mr. Bunnell has served as director of personnel for more than six years. In his new position, Mr. Shenk will be in charge of commercial, industrial and residential development, as well as community development. All sales departments in the company will report to him. With the company for 25 years, Mr. Shenk served as director of the commercial development department from 1945 to 1954. Mr. Bunnell's new position gives him responsibility for all labor relations, personnel policies and the safety department. He has been with Florida Power since 1926, joining the personnel department in 1944. He was appointed director of personnel in 1950.

The duties of **Miss Ethel Lord,** home service director of Jersey Central Power & Light Co., have been expanded to include that company as well as New Jersey Power & Light Co. Miss Lord's department eventually will include nine field home service representatives working in the six divisions of the combined companies. She joined JCP&L in 1950 after 15 years' experience in the home service field. Miss Lord attended Albright College in Pennsylvania.

H. P. Hoheisel, advertising and publicity manager of Oklahoma Gas & Electric Co., was elected president of Oklahoma Utilities Association. The second vice president is **Wright Canfield,** vice president of Public Service Co. of Oklahoma, and treasurer is **H. H. Ferrin,** vice president and treasurer, OG&E.

George A. Hills has been named purchasing agent for the Central Maine Power Co., succeeding **Wallace A. Price** who has retired. Mr. Hills was assistant to Mr. Price. Mr. Hills joined the company in 1945 and served in the purchasing department and later as expediter. In 1952 he was named to his most recent position. Mr. Price served with the company for 37 years. He was purchasing agent from 1934 until he retired.

Walter Y. Cottom was appointed manager of purchasing for West Penn Power Co., following the recent retirement of **Daniel E. Winslow** after 42 years of service. Mr. Cottom, veteran of 22 years service with the electric company, has been assistant manager of purchasing since 1955. After being graduated from Penn State, he joined West Penn in 1934 and served for many years as assistant personnel director, personnel manager and manager of personnel services and employment. He is a member of the EEI Purchasing and Stores Committee, and vice chairman, General Section of Pennsylvania Electric Association.

Harry Ferguson, operating vice president of Pennsylvania Power & Light Co., has been named a director of PP&L.

Robert P. Welsh, assistant secretary and assistant treasurer of Gulf Power Co., has been elected secretary and treasurer of the company.

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

OFFICERS

D. S. KENNEDY, *President* ..... Oklahoma Gas and Electric Co., Oklahoma City, Okla.
J. W. MCAFEE, *Vice President* ..... Union Electric Co., St. Louis, Mo.
EDWIN VENNARD, *Vice President and Managing Director* ..... 420 Lexington Ave., New York, N. Y.
H. S. SUTTON, *Treasurer* ..... Consolidated Edison Co. of New York, Inc., New York, N. Y.
A. B. MORGAN, *Secretary and Assistant Managing Director* ..... 420 Lexington Ave., New York, N. Y.

BOARD OF DIRECTORS

(*Terms expiring 1957*)

R. P. BRIGGS ..... Consumers Power Co., Jackson, Mich.
W. J. CLAPP ..... Florida Power Corp., St. Petersburg, Fla.
J. E. CORETTE ..... The Montana Power Co., Butte, Mont.
C. P. CRANE ..... Baltimore Gas and Electric Co., Baltimore, Md.
A. S. CUMMINS ..... The California Oregon Power Co., Medford, Ore.
THOMAS G. DIGNAN ..... Boston Edison Co., Boston, Mass.
E. W. DOEBLER ..... Long Island Lighting Co., Mineola, N. Y.
JOHN W. EVERS ..... Commonwealth Edison Co., Chicago, Ill.
C. E. IDE ..... The Toledo Edison Co., Toledo, Ohio
S. R. KNAPP ..... The Connecticut Light & Power Co., Berlin, Conn.
C. B. MCMANUS ..... The Southern Co. Inc., Atlanta, Ga.
R. S. NELSON ..... Gulf States Utilities Co., Beaumont, Texas
W. A. PARISH ..... Houston Lighting & Power Co., Houston, Texas
HAROLD QUINTON ..... Southern California Edison Co., Los Angeles, Calif.
L. V. SUTTON ..... Carolina Power & Light Co., Raleigh, N. C.

(*Terms expiring 1958*)

J. L. BATES ..... Central Power and Light Co., Corpus Christi, Texas
A. M. BEEBEE ..... Rochester Gas and Electric Corp., Rochester, N. Y.
F. D. CAMPBELL ..... Cambridge Electric Light Co., Cambridge, Mass.
C. B. DELAFIELD ..... Consolidated Edison Co. of New York, Inc., New York, N. Y.
R. H. GERDES ..... Pacific Gas and Electric Co., San Francisco, Calif.
N. B. GUSSETT ..... Iowa Power and Light Co., Des Moines, Iowa
E. L. LINDSETH ..... The Cleveland Electric Illuminating Co., Cleveland, Ohio
D. C. LUCE ..... Public Service Electric and Gas Co., Newark, N. J.
M. S. LUTHRINGER ..... Central Illinois Public Service Co., Springfield, Ill.
C. E. OAKES ..... Pennsylvania Power & Light Co., Allentown, Pa.
H. T. PRITCHARD ..... Indianapolis Power & Light Co., Indianapolis, Ind.
K. M. ROBINSON ..... The Washington Water Power Co., Spokane, Wash.
L. M. SMITH ..... Alabama Power Co., Birmingham, Ala.
HAROLD TURNER ..... American Gas and Electric Service Corp., New York, N. Y.

(*Terms expiring 1959*)

H. J. CADWELL ..... Western Massachusetts Electric Co., Greenfield, Mass.
STUART COOPER ..... Delaware Power & Light Co., Wilmington, Del.
CARL J. FORSBERG ..... Wisconsin Power and Light Co., Madison, Wis.
ALLEN S. KING ..... Northern States Power Co., Minneapolis, Minn.
C. E. KOHLHEPP ..... Jersey Central Power & Light Co., Asbury Park, N. J.
C. R. LANDRIGAN ..... The Detroit Edison Co., Detroit, Mich.
J. E. LOISEAU ..... Public Service Co. of Colorado, Denver, Colo.
EARLE J. MACHOLD ..... Niagara Mohawk Power Corp., Syracuse, N. Y.
D. C. MCKEE ..... The Empire District Electric Co., Joplin, Mo.
P. H. POWERS ..... West Penn Power Co., Greensburg, Pa.
R. G. RINCLIFFE ..... Philadelphia Electric Co., Philadelphia, Pa.
R. E. RITCHIE ..... Arkansas Power & Light Co., Little Rock, Ark.
W. H. SAMMIS ..... Ohio Edison Co., Akron, Ohio
J. R. WELSH ..... Southwestern Gas and Electric Co., Shreveport, La.
ERWIN H. WILL ..... Virginia Electric and Power Co., Richmond, Va.

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C. B. Delafield, T. G. Dignan, A. S. King, E. L. Lindseth, C. E. Oakes, Harold Quinton
R. G. Rincliffe, W. H. Sammis, L. V. Sutton

EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

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D. C. BARNES.....Virginia Electric and Power Co.
A. D. BARNEY.....The Hartford Electric Light Co.
W. C. BECKJORD.....The Cincinnati Gas & Electric Co.
J. B. BLACK.....Pacific Gas and Electric Co.
W. L. CISLER.....The Detroit Edison Co.
T. W. DELZELL.....Portland General Electric Co.
EDGAR H. DIXON.....Middle South Utilities, Inc.
R. DUNN.....Potomac Electric Power Co.
PHILIP A. FLEGER.....Duquesne Light Co.
GEORGE M. GADSBY.....Utah Power & Light Co.
WILLIS GALE.....Commonwealth Edison Co.
GEORGE L. MACGREGOR.....Texas Utilities Co.
J. W. MCAFEE.....Union Electric Co.
LYLE MCDONALD....Public Service Electric and Gas Co.
PAUL B. MCKEE.....Pacific Power & Light Co.
I. L. MOORE.....New England Electric System
W. C. MULLENDORE.....Southern California Edison Co.
GROVER C. NEFF.....Wisconsin Power and Light Co.
J. S. OSBORNE.....Central & South West Corp.
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J. B. THOMAS.....Texas Electric Service Co.
E. S. THOMPSON.....The West Penn Electric Co. (Inc.)
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ALLEN VAN WYCK.....Illinois Power Co.
E. A. YATES.....The Southern Co., Inc.

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ACCOUNTING

Accounting Division Executive, R. G. SCHNEIDER.....Virginia Electric and Power Co., Richmond, Va.
Coordinator of Customer Activities Group, B. J. MCMILLEN.....The Cincinnati Gas & Electric Co., Cincinnati, Ohio
Customer Accounting, A. B. WILSON.....Georgia Power Co., Atlanta, Ga.
Customer Collections, W. E. TRAVIS.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Customer Relations, J. W. KEHOE.....Commonwealth Edison Co., Chicago, Ill.
Coordinator of General Activities Group, A. P. THOMPSON.....Iowa Power and Light Co., Des Moines, Iowa
Depreciation Accounting, P. K. READ.....New York State Electric & Gas Corp., Ithaca, N. Y.
General Accounting, A. T. EMMONS.....West Penn Power Co., Greensburg, Pa.
Internal Auditing, R. E. TATE.....Kansas Gas and Electric Co., Wichita, Kans.
Plant Accounting and Property Records, A. C. HERRON.....Florida Power Corp., St. Petersburg, Fla.
Taxation Accounting, R. J. VAN ESS.....Consumers Power Co., Jackson, Mich.
Coordinator of Special Activities Group, J. D. ELLIOTT.....The Detroit Edison Co., Detroit, Mich.
Accounting Developments Service, A. H. KERN.....Alabama Power Co., Birmingham, Ala.
Accounting Employee Relations, J. F. MCCAHON.....Philadelphia Electric Co., Philadelphia, Pa.
Application of Accounting Principles, R. R. FORTUNE.....Pennsylvania Power & Light Co., Allentown, Pa.
Electronic Accounting Machine Development, RUSSELL BRITT.....Wisconsin Electric Power Co., Milwaukee, Wis.
Uniform System of Accounts, P. R. LAWSON.....Pennsylvania Electric Co., Johnstown, Pa.

COMMERCIAL

Commercial Division Executive, T. O. MCQUISTON.....Metropolitan Edison Co., Reading, Pa.
Commercial Sales Group, R. I. BULL.....Ohio Power Co., Canton, Ohio
Farm Group, M. O. WHITHED.....Atlantic City Electric Co., Atlantic City, N. J.
Industrial Power & Heating Group, F. E. WIATT.....The Cincinnati Gas & Electric Co., Cincinnati, Ohio
Residential Group, ROBERT L. COE.....Union Electric Co., St. Louis, Mo.
Special Services Group, B. L. PALM.....Central Illinois Public Service Co., Springfield, Ill.

ENGINEERING

Engineering & Operating Division Executive, C. W. FRANKLIN...Consolidated Edison Co. of N. Y., Inc., New York, N. Y.
Electrical System & Equipment, H. E. DEARDORFF.....The Dayton Power and Light Co., Dayton, Ohio
Hydraulic Power, L. B. CARD.....Public Service Co. of Colorado, Denver, Colo.
Meter & Service, G. J. YANDA.....The Cleveland Electric Illuminating Co., Cleveland, Ohio
Prime Movers, J. M. DRISCOLL.....Consolidated Edison Co. of N. Y., Inc., New York, N. Y.
Transmission & Distribution, G. H. FIEDLER.....Rochester Gas and Electric Corp., Rochester, N. Y.

GENERAL

General Division Executive, J. W. MCAFEE.....Union Electric Co., St. Louis, Mo.
Accident Prevention, R. W. WHITE.....Pacific Gas and Electric Co., San Francisco, Calif.
Area Development, J. R. FREDERICK.....Wisconsin Power & Light Co., Madison, Wis.
Atomic Power, E. H. DIXON.....Middle South Utilities Inc., New York, N. Y.
Awards, G. W. OUSLER.....Duquesne Light Co., Pittsburgh, Pa.
Electric Power Survey, A. S. GRISWOLD.....The Detroit Edison Co., Detroit, Mich.
Financing & Investor Relations, W. J. ROSE.....American Gas and Electric Co., New York, N. Y.
Industrial Relations, J. C. ARNELL.....Consolidated Edison Co. of N. Y., Inc., New York, N. Y.
Insurance, R. D. CONSTABLE.....Niagara Mohawk Power Corp., Syracuse, N. Y.
Legal, J. M. KEEGAN.....Consolidated Edison Co. of N. Y., Inc., New York, N. Y.
Membership, E. S. THOMPSON.....The West Penn Electric Co. (Inc.), New York, N. Y.
Purchasing & Stores, E. N. SCOTT.....Long Island Lighting Co., Hicksville, N. Y.
Rate Research, L. W. FRANK.....Western Massachusetts Electric Co., Springfield, Mass.
Regulation, J. E. CORETTE.....The Montana Power Co., Butte, Mont.
Research Projects, E. H. SNYDER.....Public Service Electric and Gas Co., Newark, N. J.
Statistical, F. A. KEANE.....Public Service Electric and Gas Co., Newark, N. J.
Tax Policy, C. B. MCMANUS.....The Southern Co., Inc., Atlanta, Ga.
Technical Assistance for Overseas Visitors, HARVEY BUMGARDNER.....The Detroit Edison Co., Detroit, Mich.
Transportation, R. E. HAMEL.....The Cleveland Electric Illuminating Co., Cleveland, Ohio

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